BROOKLYN BOTANIC GARDEN

RECORD

VOL. XVII JANUARY, 1928 No. 1

EDITED BY
C. STUART GAGER

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† Resigned October 1, 1927.
** Resigned, October 29, 1927.

BROOKLYN
BOTANIC GARDEN

RECORD

VOL. XVII JANUARY, 1928 No. 1

DELECTUS SEMINUM, BROOKLYN 1927

LIST OF SEEDS OFFERED IN EXCHANGE

These seeds, collected during 1927, are offered to botanic gardens and to other regular correspondents; also, in limited quantities, to members of the Brooklyn Botanic Garden.

We offer this year seeds of woody plants only.

Seeds marked AA were collected in the Arnold Arboretum, through the courtesy of the keeper, Mr. E. H. Wilson.

GYMNOSPERMAE

Cupressaceae

Thuya
- Standishii

Cycadaceae

Cycas
- revoluta

Ginkgoaceae

Ginkgo
- biloba

Pinaceae

Cedrus
- Libani

Pinus
- densiflora AA
- rigida
- Strobus
- virginiana

Sequoia
- gigantea

Tsuga
- canadensis
- diversifolia

Taxaceae

Taxus
- cuspidata

DICOTYLEDONES

Aceraceae 163

Acer
- campestre
- diabolicum purpurascens AA
- ginnala
- japonicum
- Negundo
- Opalus
- palmatum
- pennsylvanicum
- pseudoplatanus
- saccharum
- spicatum
- tataricum AA

Anacardiaceae 153

Cotinus
- Coggygria

Rhus
- copallina
- glabra
- Toxicodendron
- typhina

Apocynaceae 247

Alyxia
- buxifolia

Aquifoliaceae 157

Ilex
- crenata
- decidua AA
- glabra
- serrata
- verticillata

Nemopanthus
- mucronata

Araliaceae 227

Acanthopanax
- divaricatus

Aralia
- spinosa

Berberidaceae 93

Berberis
- aggregata
- circumserrata AA
- Poiretti latifolia
- Regeliana
- Thunbergii

Betulaceae 61

Alnus
- rugosa AA

Betula
- japonica
- lenta
- populifolia

Carpinus
- caroliniana

Ostrya
- virginiana

Bignoniaceae 258

Catalpa
- speciosa

Buxaceae 149

Pachysandra
- terminalis

Calycanthaceae 96

Calycanthus
- floridus AA

Caprifoliaceae 271

Diervilla
- florida
- Lonicera
- rivularis
- sessilifolia

Leycesteria
- formosa

Lonicera
- Henryi AA
- Maackii
- Maackii var. podocarpa
- japonica

Sambucus
canadensis
Symphoricarpos
albus
occidentalis
occidentalis var. Heyeri
Viburnum
acerifolium
cassinoides
dentatum
hupehense
Opulus var. americanum
prunifolium
scabrellum
Taquetii AA
theiferum
tomentosum

Celastraceae 158

Celastrus
articulata AA
flagellaris AA
scandens
Euonymus
Bungeana
europaea
Maackii AA
oxyphylla
radicans AA

Clethraceae 230

Clethra
acuminata AA
alnifolia
barbinervis AA

Combretaceae 221

Terminalia
Arjuna

Cornaceae 229

Cornus
alba
brachypoda
canadensis
florida
Nuttallii
obliqua
paucinervis
racemosa
stolonifera flaviramea

Ebenaceae 240

Diospyros
virginiana

Elaeagnaceae 215

Elaeagnus
angustifolia
umbellata

Ericaceae 233

Enkianthus
campanulatus AA
deflexus AA
Erica
vagans
Gaultheria
procumbens
Kalmia
angustifolia
latifolia
Ledum
groenlandicum
Leucothoe
racemosa
Lyonia
ligustrina
mariana
Oxydendrum
arboreum
Pieris
floribunda
Rhododendron
catawbiense
indicum
maximum
nudiflorum
Zenobia
pulverulenta AA

Ericaceae
—Vaccinioideae 233a

Gaylussacia
baccata

Vaccinium
canadense
macrocarpon
pennsylvanicum

Euphorbiaceae 147

Dalechampia
Roezliana
Phyllanthus
grandifolius

Fagaceae 62

Quercus
velutina

Guttiferae 187

Hypericum
galioides AA
lobocarpum AA

Hamamelidaceae 123

Hamamelis
virginiana
Liquidambar
styraciflua

Lauraceae 102

Benzoin
aestivale

Leguminosae
—*Caesalpinoideae 127b*

Gleditschia
triacanthos

Leguminosae
—*Papilionatae 128*

Amorpha
fruticosa
Caragana
arborescens
aurantiaca AA
brevispina AA
microphylla
Clitoria
Ternatea
Colutea
arborescens AA
cilicica AA
media
Cytisus
albus
albus roseus
prostratus
scoparius
Dorycnium
hirsutum AA
Genista
dalmatica
sagittalis
Lespedeza
formosa
macrocarpa
Maackia
amurensis
Oxytropis
campestris
Robinia
hispida

Loganiaceae 245

Buddleia
albiflora
Davidii
Davidii var. magnifica
Davidii var. Veitchiana
Davidii var. Wilsonii
nivea

Magnoliaceae 95

Liriodendron
Tulipifera
Magnolia
tripetala
Schizandra
chinensis AA

Menispermaceae 94

Menispermum
canadense

Moraceae 64

Ficus
diversifolia
Maclura
pomifera

Myricaceae 57

Myrica
carolinensis

Myrtaceae 222

Myrtus
communis

Nyssaceae 226b

Nyssa
sylvatica

Oleaceae 243

Chinanthus
virginica
Fraxinus
longicuspus
Ligustrum
Ibota
Ibota var. Regelianum
ovalifolium
vulgare
Syringa
japonica

Polygonaceae 77

Polygonum
Auberti

Ranunculaceae 91

Clematis
virginiana
Zanthorhiza
apiifolia

Rhamnaceae 169

Rhamnus
cathartica
Frangula

Rosaceae 126

Exochorda
racemosa AA
Physocarpus
opulifolius
Rhodotypos
kerrioides
Rosa
alba
multiflora AA
multiflora cathayensis
rugosa
tenuicarpa
Wichuriana
Rubus
odoratus
Sorbaria
Aitchisonii
arborea var. glabrata
sorbifolia
stellipila
Spiraea
Billiardii
Douglasii
japonica
latifolia
Margaritae
tomentosa
trichocarpa AA

Rosaceae
—Pomoideae 126a

Aronia
arbutifolia
atropurpurea
melanocarpa
Cotoneaster
bullata
Dielsiana
divaricata
foveolata
Franchetii
horizontalis
horizontalis var. perpusilla
lucida
montana
nitens
Zabelii
Chaenomeles
cathayensis
Crataegus
barbara
coccinioides

compta
durobriviensis
persimilis
Phaenopyrum AA
pinnatifida
Malus
atrosanguinea
floribunda
theifera
Zumi
Photinia
arbutifolia
Rhapiolepis
umbellata
Sorbus
americana

Rosaceae
—Prunoideae 126b

Prunus
Laurocerasus
pennsylvanica
sibirica AA

Rubiaceae 270

Cephalanthus
occidentalis

Rutaceae 137

Citrus
taitensis
Evodia
Daniellii
hupehensis
Phellodendron
chinense AA
sachalinense
Ruta
graveolens
Zanthoxylum
Bungei

Saxifragaceae 117

Deutzia
longifolia
Schneideriana laxiflora
Wilsonii AA
Hydrangea
arborescens
paniculata
Itea
virginica
Philadelphus
coronarius fl. pl.
Lemoinei
Lewisii
Satsumi
pubescens
Ribes
fasciculatum var. chinense AA
lacustre
rubrum

Simarubaceae 138

Ailanthus
glandulosa

Solanaceae 256

Lycium
barbarum
chinense
halimifolium
Solanum
pseudocapsicum

Staphyleaceae 161

Staphylea
trifolia

Sterculiaceae 178

Abroma
mollis

Styracaceae 242

Halesia
carolina
monticola rosea AA
Styrax
japonica
Obassia

Symplocaceae 241

Symplocos
paniculata

Tamaricaceae 191

Tamarix
odessana

Tiliaceae 174

Grewia
parviflora AA
Tilia
cordata
Oliveri AA

Ulmaceae 63

Celtis
occidentalis

Verbenaceae 253

Callicarpa
dicotoma
Giraldii
japonica
Clerodendron
trichotomum
Vitex
Agnus-castus
Negundo var. incisa

Vitaceae 170

Ampelopsis
brevipedunculata AA
heterophylla
Parthenocissus
quinquefolia
tricuspidata
Vitis
Berlandieri AA

MONOCOTYLEDONES

Liliaceae 338

Smilax
glauca
hispida AA
rotundifolia
Walteri

Applications for seeds should be received not later than March 1, 1928. In case this list is not returned, please mention the family number.

Address all requests to

SEED EXCHANGE,
Brooklyn Botanic Garden,
100 Washington Ave.,
Brooklyn, N. Y., U. S. A.

INTERNATIONAL SEED EXCHANGE

The following is a list of the 125 botanic gardens and other botanical institutions from which the Brooklyn Botanic Garden has received Seed Exchange Lists during 1926 and 1927.

We would appreciate receiving information as to possible errors or additions, especially regarding institutions outside of Europe which publish seed lists.

NORTH AMERICA

Canada

Central Experimental Farm,
Botanic Garden,
Ottawa, Ontario

University Botanic Gardens,
Vancouver, British Columbia

United States

Botanic Gardens,
University of Michigan,
Ann Arbor, Michigan

Harvard Botanic Garden,
Cambridge,
Massachusetts

Beal Botanic Garden,
Michigan State College,
East Lansing, Michigan

Morton Arboretum,
Lisle,
Illinois

SOUTH AMERICA

Uruguay

Jardin Botanico,
Paseos Publicos,

Montevideo

EUROPE

Portugal

Jardim Botanico,
Universidad de Coimbra,
Coimbra

Jardim Botanico,
Lisbon

Spain

Jardin Botanico de la Universidad,

Valencia

Italy

R. Orto Botanico,
Corso Dogali, I,
Genova

Hanbury Gardens,
La Mortola, Ventimiglia

R. Istituto Botanico,
Modena

R. Giardino Botanico e Coloniale,
Palermo, Sicilia

R. Instituto e Orto Botanico della Universita,
Via Farini, 174
Parma

Civivo Orto Botanico,
Trieste

Istituto e Orto Botanico,
Universita di Padova

Orto Botanico della Universita
Pavia

Orto Botanico della Universita
Pisa

Istituto E. Orto Botanico,
Via Milano, 41,
Rome

Istituto Botanico della Universita,
Siena

Orto Botanico della Universita
Torino

France

Jardin Botanique,
Bordeaux (Gironde)

Jardin Botanique,
Caen (Calvados)

Jardin Botanique,
Dijon (Cote-d'Or)

Jardin Botanique,
Marseille

Jardin Botanique,
Metz (Lorraine)

Jardin des Plantes,
Montpellier (Hérault)

Jardin des Plantes,
Nancy (Meurthe-et-Moselle)

Jardin des Plantes,
Nantes (Loire Inf.)

Ecoles Forestières des Barres,
Nogent-sur-Vernisson
(Loiret)

Jardin des Plantes,
Museum d'Histoire Naturelle,
61 rue de Buffon,
Paris (5me)

Jardin Botanique,
Rouen (Seine Inf.)

Jardin Botanique de Talence
près Bordeaux (Gironde)

Jardin Botanique,
Toulouse (Haute Garonne)

Jardin Botanique,
Parc de la Tête d'Or,
Lyon (Rhone)

England

University Botanic Garden,
Cambridge

Chelsea Physic Garden,
London S.W.3

Royal Botanic Gardens,
Kew, Surrey

Royal Botanic Garden,
Edinburgh

University Botanic Garden,
Oxford

Scotland

Botanic Gardens,
Glasgow

Irish Free State

Botanic Gardens,
Glasnevin, Dublin

Trinity College Botanic Garden,
Ball's Bridge, Dublin

Holland

Jardin Botanique de l'Université,
Amsterdam

Jardin Botanique de l'Université Technique,
Portlandlaan 35,
Delft

Jardin Botanique de l'Université,
Groningen

Cantonspark,
Javalaan 5,
Baarn

Jardin Botanique,
Leiden

Jardin Botanique de l'Université,
Utrecht

Botanical Garden,
Landbouw-Hoogeschool Afd. Plantkunde,
Wageningen

Belgium

Jardin Botanique,
Leopoldstr. 24,
Antwerp

Jardin Botanique de l'Université,
Liège

Germany

Botanischen Garten und Museum,
Königin-Luise Str. 6–8,
Berlin-Dahlem

Botanischen Garten,
Bonn, Rheinprovinz

Botanischen Garten,
Breslau

Botanischen Garten,
Bremen 1

Botanischen Schulgarten der Stadt,
Rothenditmolder-Strasse 14,
Cassel

Botanischen Garten,
Darmstadt

Botanischen Garten,
Dresden, Sachsen

Botanischen Garten der Universität,
Erlangen, Bayern

Botanischen Garten der Universität,
Frankfurt-am-Main

Botanischen Garten der Universität,
Tübingen, Würtemburg

Botanischen Garten der Universität,
Giessen

Botanischen Garten,
Göttingen

Institut fur Allgemeine Botanik,
Juniusstrasse 6,
Hamburg 36

Botanischen Garten der Universität,
Heidelberg

Botanischen Garten,
Kiel

Botanischen Garten der Universität,
Königsberg, Ostpreussen

Botanischen Garten der Universität,
Marburg

Botanischen Garten,
München-Nymphenburg

Botanischen Garten der Forstlichen Hochschule,
Hann, Munden, Werraweg 1

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Proskau, Oberschlesien

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Norway

Botaniske Have, Oslo

Sweden

Botaniska Trädgarden,
Gothenburg

Botaniska Trädgården,
University of Lund,
Lund

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Bergielund, Stockholm

Universitetets Botaniska Trädgarden,
Upsala

Switzerland

Botanischen Garten,
Basel

Botanischen Garten,
Bern

Jardin Botanique,
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Jardin Botanique,
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Botanischen Garten der
Deutschen Universität,
Prag—II, Vinicna 3a

Botanicka zahrada,
University Karlovy,
Praha—II, 433

Spolkova Zahrada,
V. Pruhonice, V. Praze

Botanicka Zahrada,
Roudnice

Botanicka zahrada zemske vyssi
skoly hospodarske,
Tabor

Poland

Ogrod Botaniczny,
Uniwersytetu Jajiellonskiego,
Ul. Lubica 46,
W. Krakowie

Station Botanique et Agricole,
Rue Zyblikiewiczal 40
Lwow (Leopol),

Institut de Pharmacognosie
Université,
Vilno

Ogrod Botaniczny,
Uniwersytetu Warszawkiego,
Warsaw

Esthonia

Jardin Botanique,
Dorpat

Latvia

Jardin Botanique de l'Univer-
sité de Lettonie,
Riga

Lithuania

Lietuvos Universiteto,
Botanikos Sodnas,
Kaunas

Russia (U.S.S.R.)

Jardin Botanique de
l'Université,
Leningrad

Bureau of Introduction,
Institute of Applied Botany
and New Cultures,
44 Herzen Street,
Leningrad

Jardin Botanique,
Odessa

Jardin Botanique,
Nikita, Jalta Crimée

Jardin Botanique,
Tiflis, Georgia

Jardin Botanique,
Kieff

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Botanischen Garten,
Linz a. Donau

Botanischen Garten der
Universität,
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Hungary

Botanischen Garten,
Budapest

Jugoslavia

Jardin Botanique
" Jevremovac,"
Université de Belgrade,
Belgrade

Jardin Botanique,
Zagreb

Bulgaria

Jardin Botanique de l'Université,
Sofia

Botanical Garden of the faculty of Agriculture,
The University,
Sofia

Roumania

Gradina Botanica a Universitatii,
Cernauti

Gradinii Botanice si al Muzeului Botanic dela Universitatea,
Cluj

Gradina Botanica a Universitatii,
Bucarest

AFRICA

Ministry of Agriculture,
Horticultural Section,
Giza (Mudiriya) Egypt

National Botanic Gardens,
Kirstenbosch, Newlands,
Cape Town, S. Africa

Jardin Botanique de
l'Université,
Alger (Algerie)

Jardin Botanique,
Tunis, N. Africa

ASIA

Japan

Botanic Garden of the College
of Agriculture,
Hokkaido Imperial University,
Sapporo

Botanic Gardens,
Imperial University,
Koishikawa,
Tokyo

India

Government Botanic Gardens,
Lal-Bagh, Bangalore

Java

's Lands Plantentuin,
Buitenzorg, Dutch East Indies

China

Experimental Farm Echo,
P. O. Tieh-Ling Ho,
Kirin Province,
Manchuria

Central Asia

Institutum Botanicum,
Universitatis Asiae Mediae,
Uzbekistan, Taschkent,
U. S. S. R.

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GENERAL INFORMATION

Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, Brooklyn, N. Y.* Telephone, 6173 Prospect.

The Botanic Garden is open free to the public daily from 8 a.m. until dark; on Sundays and Holidays open at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard (Malbone Street), and near Mt. Prospect Reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Montgomery Street.

To Assist Members and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one week in advance. No parties of less than six adults will be conducted.

To Reach the Garden take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, and Tompkins Avenue trolleys to Washington Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street and Vanderbilt Avenue trolleys to Prospect Park Plaza and Union Street.

PUBLICATIONS
OF THE
BROOKLYN BOTANIC GARDEN

RECORD. Established, January, 1912. An administrative periodical issued quarterly. Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, announcements of courses of instruction, seed list, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others one dollar a year; 25 cents a copy.

MEMOIRS. Established, July, 1918. Published irregularly.

Volume I. *Dedication Papers:* comprising 33 scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. 521 pages. Price $3.50, plus postage.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk: A study of grassland and forest. By Norman Taylor, June 11, 1923. 108 pages. Price $1.00, plus postage.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor, June 10, 1927. 151 pages. Price $1.60.

CONTRIBUTIONS. Established, April 1, 1911. Papers originally published in periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume.

43. Inheritance studies in Pisum. V. The inheritance of scimitar pod. 14 pages, 10 figures. 1925.

44. Modes of infection of sorghums by loose kernel smut. 17 pages, 3 plates. 1925.

45. The inheritance of resistance of oat hybrids to loose smut. 19 pages. 1925.

46. Geographical distribution and the cold-resisting character of certain herbaceous perennial and woody plant groups. 10 pages. 1926.

47. The cause of the persistent development of basal shoots from blighted chestnut trees. 7 pages, 1 figure. 1926.

48. Further evidence of physiologic races of oat smuts. 8 pages. 1927.

49. Chromosome and gene mutations in Datura following exposure to radium rays. 5 pages. 1927.

50. The climate of Long Island; its relation to forests, crops, and man. 20 pages, 2 plates. 1927.

51. Experimental studies on head smut of corn and sorghum. 16 pages, 5 plates. 1927.

52. Inheritance studies in Pisum. VI. Multiple allelomorphism and the inheritance of green and yellow foliage and pod color. 16 pages. 1927.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication.

SEED LIST. Established, December, 1914. Since 1925 issued each year in the January number of the RECORD.

AMERICAN JOURNAL OF BOTANY. Established, January, 1914. Published, in coöperation with the BOTANICAL SOCIETY OF AMERICA, monthly, except during August and September. Subscription, $7.00 a year.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $4.00 a year.

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MAR 26 1929

Seventeenth Annual Report

of the

Brooklyn Botanic Garden

1927

"A botanical garden is not only one of the most useful and most important of public improvements, but it also comprises within a small compass the history of the vegetable species of our own country; and by the introduction of exotics, makes us acquainted with the plants of the most distant parts of the earth."
—*Transactions, New York State Agricultural Society, 1794*

Brooklyn Botanic Garden Record

Vol. XVII APRIL, 1928 No. 2

PUBLISHED QUARTERLY

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BY THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN, N. Y.

Entered as second-class matter in the Post-office at Lancaster, Pa., under Act of August 24, 1912.

Brooklyn Botanic Garden

Scientific, Educational, and Administrative Officers

SCIENTIFIC AND EDUCATIONAL

The Staff *

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MONTAGUE FREE, *Horticulturist*
ARTHUR HARMOUNT GRAVES, Ph.D., *Curator of Public Instruction*
ALFRED GUNDERSEN, Docteur de l'Université (Paris), *Curator of Plants*
ELSIE TWEMLOW HAMMOND, M.A., *Assistant Curator of Elementary Instruction*
GEORGE M. REED, Ph.D., *Curator of Plant Pathology*
ELLEN EDDY SHAW, B.S., *Curator of Elementary Instruction*
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———————, *Curator of Plant Breeding and Economic Plants*

Other Officers

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RUTH BLANKLEY, *Stenographer*
FRANCES MILLER MACKINNON, *Stenographer*

LOUIS BUHLE, *Photographer*

* The names are arranged alphabetically.

Seventeenth Annual Report

of the

Brooklyn Botanic Garden

1927

BROOKLYN BOTANIC GARDEN
FOR THE ADVANCEMENT OF BOTANY
AND THE SERVICE OF THE CITY
MCMX
THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

For Science
For Education
For the Schools
For the Public

BROOKLYN, N. Y.
APRIL, 1928

LANCASTER PRESS, INC
LANCASTER, PA.

BROOKLYN BOTANIC GARDEN

SUMMARY FOR 1927

For Science

1. Continued botanical research in plant pathology, genetics, plant breeding, forest pathology, ecology, genetics, plant physiology.

2. Published 156 research articles.

3. Published Volume III of Brooklyn Botanic Garden MEMOIRS.

4. Continued the publication of three journals devoted exclusively to research, and having a world-wide circulation.

For Education

5. Gave 34 courses of instruction to adults and children, with a total registration of over 5,200.

6. Gave 458 lectures to adults and children with a total attendance of over 25,000.

For the Schools

7. Over 25,000 plants placed in classrooms of 130 schools.

8. 3,000 teachers in 121 schools, supplied with living plants, plant parts, and other study material in quantity sufficient for the instruction of over 109,000 pupils.

9. 670 teachers held conferences with members of staff concerning problems of teaching biology and nature-study.

10. 102 talks, addresses, and model lessons were given in schools by members of the Botanic Garden staff; attendance, 35,000.

11. 2,300 Petri dishes with sterilized agar supplied for the study of bacteria.

12. Over 705,000 penny packets of seeds supplied to pupils for planting in school and home gardens.

For the Public

13. Over 1,013,000 visitors registered at the entrance turnstiles.

14. Bureau of information on gardening and plant life maintained free to the public.

15. Free library on plant life and gardening served over 7,000 readers.

16. Maintained and developed one of the most beautiful spots in Greater New York.

17. Members enjoy special privileges. Information on request.

INFORMATION CONCERNING MEMBERSHIP

The Brooklyn Institute of Arts and Sciences is organized in three main departments: 1. The Department of Education. 2. The Museums. 3. The Botanic Garden.

Any of the following seven classes of membership may be taken out through the Botanic Garden:

1. Annual member	$ 10	5. Donor	$ 10,000
2. Sustaining member	25	6. Patron	25,000
3. Life member	500	7. Benefactor	100,000
4. Permanent member	2,500		

Sustaining members are annual members with full privileges in Departments one to three. Membership in classes two to seven carries full privileges in Departments one to three.

In addition to opportunities afforded to members of the Botanic Garden for public service through cooperating in its development, and helping to further its aims to advance and diffuse a knowledge and love of plants, to help preserve our native wild flowers, and to afford additional and much needed educational advantages in Brooklyn and Greater New York, members may also enjoy the privileges indicated on the following page.

Further information concerning membership may be had by addressing The Director, Brooklyn Botanic Garden, Brooklyn, N. Y., or by personal conference by appointment. Telephone, 6173 Prospect.

.....

Date .....

To The Secretary,
Brooklyn Botanic Garden,
1000 Washington Ave., Brooklyn, N. Y.

Dear Sir:

I desire to become

An Annual Member	$ 10	A Donor	$ 10,000
A Sustaining Member ...	25	A Patron	25,000
A Life Member	500	A Benefactor	100,000
A Permanent Member ...	25,000		

Please find enclosed my check payable to Brooklyn Botanic Garden, and present my name to the Board of the Trustees for election.

Yours truly,

Name .....

Address .....

PRIVILEGES OF MEMBERSHIP

1. Free admission to the buildings and grounds at all times.
2. Cards of admission for self and friends to all exhibitions and openings preceding the admission of the general public, and to receptions.
3. Services of docent (by appointment), for self and party, when visiting the Garden.
4. Admission of member and his or her immediate family to all lectures, classes, field trips, and other scientific meetings under Garden auspices, at the Garden or elsewhere.
5. Special lectures and classes for the children of members.
6. Copies of Garden publications, as follows:

    a. Record
    b. Guides
    c. Leaflets
    d. Contributions
    e. Frequent Announcement Cards concerning plants in flower and other exhibits

7. Privileges of the Library and Herbarium.
8. Expert advice on the choice and care of plants, indoors and out, on planting the home grounds, the care of lawns, and the treatment of plants affected by insect and fungous pests.
9. Identification of botanical specimens.
10. Participation in the periodical distribution of duplicate plant material and seeds, in accordance with special announcements sent to members from time to time.

FORMS OF BEQUEST TO THE BROOKLYN BOTANIC GARDEN

Form of Bequest for General Purposes

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which said sum is to be used for the educational and scientific work of the Brooklyn Botanic Garden.

Form of Bequest for a Curatorship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, as an endowment for a curatorship in the Brooklyn Botanic Garden, the income from which sum is to be used each year towards the payment of the salary of a curator in said Botanic Garden, to be known as the (here may be inserted the name of the donor or other person) curatorship.

Form of Bequest for a Fellowship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which sum is to be used in the payment of a fellowship for advanced botanical investigation in the Brooklyn Botanic Garden, to be known as the .....fellowship.

Form of Bequest for other particular purposes designated by the testator

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, to be used (or the income from which to be used) for the Brooklyn Botanic Garden *

.....

.....

* The following additional purposes are suggested for which endowment is needed.

1. Botanical research.
2. Publishing the results of botanical investigations.
3. Popular botanical publication.
4. The endowment of a lectureship, or a lecture course.
5. Botanical illustration for publications and lectures.
6. The purchase and collecting of plants.
7. The beautifying of the grounds.
8. The purchase of publications for the library.
9. Extending and enriching our work of public education.

FIG. 1. Formal Garden, north of the Children's Building. (5457.)

SEVENTEENTH ANNUAL REPORT

OF THE

BROOKLYN BOTANIC GARDEN

1927 [1]

REPORT OF THE DIRECTOR

To the Botanic Garden Governing Committee:

I have the honor to present herewith the seventeenth annual report of the Brooklyn Botanic Garden, for the year 1927.

The New Rose Garden

"Who ever reads an annual report?" This rhetorical question is usually asked with the implication that the answer is, "Nobody." Too often, alas, such is the case. Written primarily to be read, annual reports often serve chiefly as safety deposit boxes, where things deemed valuable by the writer are safely stored away. But authors of such reports have their reward, not in the multitude of readers, but in the character of a select few—possibly only one or two—readers. It is the double purpose of an annual report, not only to record what has been done, but also what should be done. The importance of this is illustrated in the following brief history of the contribution for the new Rose Garden.

The preceding annual report of the Brooklyn Botanic Garden had been issued only a few days when Mr. Walter V. Cranford happened to pick up a copy of it in the office of a business associate who is a trustee of the Garden. His attention was arrested by an illustration bearing the legend, "Proposed Rose Garden." The conversation that ensued was followed by a conference at the Botanic Garden, one result of which was a correspondence which included the following letters:

[1] Brooklyn Botanic Garden Record. Vol. XVII, No. 2. April, 1928.

June 10, 1927

My dear Dr. Gager:

Confirming our conversation of Tuesday morning concerning the development of the Rose Garden in the Brooklyn Botanic Garden would say that yesterday I handed Mr. G. Foster Smith, your Treasurer, my check for $10,000. This will permit your starting work at once, have the beds prepared and ready for the fall planting.

I wish this gift to be regarded as coming from Mrs. Cranford and myself as a sort of memorial to a little child.

I will be interested in the work as it goes along; if not too much trouble will be glad to hear of its progress from time to time. I will also give myself the pleasure of visiting the gardens occasionally.

With kindest regards and best wishes for the success of our undertaking, I am, dear Mr. Gager,

Yours sincerely,

(Signed) W. V. Cranford.

June 14, 1927

Dear Dr. Gager:

In response to yours of the 11th, on Thursday, June 9, Mr. Cranford handed me his check for $10,000, being his contribution to the Brooklyn Botanic Garden for the purpose of building a Rose Garden.

This has been entered on the books of the Institute in a Special Account Fund to be used for that purpose only.

Very truly yours,

(Signed) G. Foster Smith,
Treasurer.

One of the most delightful features of this gift is indicated in the third paragraph of Mr. Cranford's letter, where the Botanic Garden is assured not only of a contribution of funds, but also of the donor's desire to maintain an active and sustained interest in the Garden— which is altogether delightful. Funds alone make it possible to do certain things, but the active, intelligent interest of a donor puts heart into the work, and enhances the value of the gift many fold. The Brooklyn Botanic Garden has been remarkably blessed with such friends ever since it was established.

The Rose Garden occupies an area of about one acre just west of the Esplanade. Its greatest length is about 500 feet, and its greatest width about 93 feet. It is enclosed by a Doric pergola at the north end, and a trellis fence with wooden panels supported by posts of white concrete, on the other sides.

Since the Rose Garden will be a major landscape feature in the Botanic Garden, and since it is so closely related to the Esplanade, which has been planned as an approach to the Brooklyn Museum when completed, the design for the garden was submitted to the architects of the Museum Building (and also of the Botanic Garden buildings) for their approval. This was given in a letter of June 14, 1927, which reads as follows:

McKim, Mead and White

June 14, 1927

Dear Dr. Gager:

We have your letter of June 13th about the rose garden. Mr. Caparn has sent me a drawing showing its situation and construction, and I have written him that it seems perfectly satisfactory.

I congratulate you on your good fortune in raising the money so soon, and understand the bearing it has upon the gifts of money for the gates.

Yours very truly,

(Signed) Wm. Mitchell Kendall.

When the director returned from his European trip on October 10, he found that the work, which began on June 14, had been discontinued for about two weeks on account of the fact that the cost, up to the date when the work ceased, slightly exceeded the amount available.

About October 20, Mr. Cranford visited the Garden, expressed his satisfaction with what had been accomplished, stated that he felt, in the beginning, that we might not be able to do all of the work for $10,000, and authorized its continuation to completion, at a cost of approximately $5,000 additional. This makes the total amount of Mr. and Mrs. Cranford's contribution, to date, $15,000.

In the appended report of the horticulturist and head gardener a detailed account is given of the season's work, including the unanticipated obstacles in the form of large glacial boulders and an old street paving which greatly added to the difficulties and cost of the work.

This Rose Garden is planned not only to be a thing of beauty (as are most rose gardens) but, in harmony with the plan of the Botanic Garden as a whole, to be an educational feature. Wild

species are included, as well as horticultural varieties, and the latter are arranged so as to illustrate the historical development of the modern horticultural varieties of hybrid teas, hybrid perpetuals, and other groups of roses. Full details of the plan must be reserved for a special guide book which it is hoped we may be able to publish in 1929.

This account should not close without mention of the exceptional beauty of the design of the Rose Garden, prepared by our consulting landscape architect, Mr. Harold A. Caparn. This it was, no doubt, which made the appeal to the donor. To Mr. Caparn, also, is to be credited the development of the educational features of the garden, which, for the present at least, put it in a class by itself. The general public will enjoy this Rose Garden as a thing of beauty; rose lovers and growers will, in addition, find here an animated text-book, so to speak, on the rose.

Mention must also be made of the exceptional skill and resourcefulness of the horticulturist, Mr. Free, in mastering the technique and overcoming the difficulties of the concrete work, all of which was done at the Botanic Garden under his immediate supervision. The planting plan has been worked out jointly by Mr. Caparn and Mr. Free.

Finally, acknowledgment is here made of the generous gifts, a total of nearly one thousand plants, from Henry A. Dreer, New Brunswick Nurseries, and The Rose Farm, recorded elsewhere in this report. Other gifts have been promised for delivery in the spring of 1928.

Significance of the Rose Garden

The new Rose Garden is both an asset and a liability. As an asset it will not only greatly enhance the beauty and interest of the Botanic Garden, but it will stimulate and foster an interest in roses and rose gardens, and also in landscape architecture, besides possessing the educational advantage, above noted, through its historical arrangement.

As a liability, the Rose Garden confers upon the Botanic Garden the responsibility of utilizing this feature to the fullest extent possible from the standpoint of botany, horticulture, and education. If the Botanic Garden measures up to its opportunities in this connection, and unless experience shall demonstrate that roses can-

not be grown successfully in large variety in this city environment, the Garden will become one of the leading rose centers, and the Rose Garden will become a Mecca for Rosarians.

In order to make this possible certain needs must be met. Here is a new major feature of annual maintenance, which will involve the preparation and publication of guide books, addressing garden clubs, and answering innumerable inquiries from the public concerning all that pertains to roses.

The garden should have a gardener experienced in the growing of roses. There will be miscellaneous items of up-keep including labor, painting and repair of structures, and the purchase of new roses that may not be secured by gift.

One Million Visitors

Ten thousand is probably an exaggerated figure for the number of visitors to the Botanic Garden during 1912, the first entire year when it was open to the public.[1] The attendance figures gradually increased until 1926 when the attendance (recorded and estimated) reached a total of 500,000 plus. The figures recorded at the entrance turnstiles for 1927 are 1,013,000 plus. The enormous increase is due in part to the fact that our records are now more accurate (showing that we had previously underestimated for gates not equipped with registering turnstiles), that population has considerably increased in the immediate neighborhood of the Garden, and in large part to the fact that the Garden becomes each year more interesting and more beautiful.

Over one million visitors a year mean an average of nearly 20,000 a week, or nearly 3,000 a day. But on Sundays and holidays the attendance is greatly in excess of this average. Thus, the attendance for Sunday, May 1, was nearly 17,000; for Memorial Day week-end (Saturday, May 28 to Monday, May 30—three days) the attendance was over 41,000. This creates a serious problem in the way of guards and other provision for the comfort and convenience of the public.

The Garden is now greatly in need of additional guards and additional seats. The time has come when there should be an attendant at each of the three principal gates. Ultimately there should be one at each gate.

[1] The Botanic Garden was first opened to the public on Linnaeus's birthday, May 13, 1911.

FIG. 2. Rose Garden. Initial grading and soil improvement operations, June 24, 1927. (6328.)

Bubbler Drinking Fountains

Since the Garden was first opened to the public there has never been any opportunity for visitors to get a drink of water on the grounds. This lack has been specially felt by those who bring children and often remain for a half day at a time. Last spring Mrs. Glentworth R. Butler, Chairman of our Woman's Auxiliary, interested herself in this matter, and secured from seven members of the Auxiliary and one annual member of the Garden contributions totaling $1,300 to be used for the purchase and installation of drinking fountains. It is estimated that this fund may provide for nine fountains. Designs are being prepared by our landscape architect, Mr. Caparn, and it is planned to install the fountains in the spring of 1928. The names of the donors may be found on page 107.

Investigations during 1927

Importance of Research

The July, 1927 issue of the Botanic Garden RECORD was devoted to a report on *Research at the Brooklyn Botanic Garden,* 1910–1927.

The only obstacles to effective scientific research are competent men and adequate funds.

The only obstacles in the way of securing adequate funds are lack of intelligent interest in and understanding of the great need of continuous research, and lack of conviction of the importance of any given project. There are abundant resources in the possession of the various foundations and of individuals of large means.

The chief problem of the foundations is to decide on the relative merits of various appeals. Contrary to a general public impression, their funds are strictly limited and far from sufficient to meet all demands, however worthy the foundation may consider them.

The total resources of possible individual donors are far in excess of those of the foundations, but men and women (other things being equal) give chiefly where they are interested. The endowment of research by individuals, therefore, depends upon

enlisting their interest as well as their confidence in the undertaking.

The object of publishing the report above referred to was to emphasize the importance of the problems that have constituted the research program of the Garden since its foundation and to enlist the interest and confidence of possible donors of permanent endowment for the continuation of this work at the Garden. Copies of the report will gladly be sent to anyone on request.

There is a more or less wide-spread impression among laymen in science that botanical research is already quite adequately provided for in the existing agricultural colleges and agricultural experiment stations, and the United States Department of Agriculture. This indicates a lack of understanding of the scope and resources of these institutions and especially of the unlimited nature of the field to be explored, and the inherent difficulty of the task.

Bacon's simile of picking up a few grains of sand here and there on the shore of the vast ocean of the unknown involves no exaggeration. One of the most effective modern statements is that of Prof. Liberty Hyde Bailey (recently president of the American Association for the Advancement of Science), published in our annual report for 1925:

"The fear that work in science may be duplicated, when a new agency enters the field, is an unconscious expression of the feeling that there exists in nature a definite sum of knowledge to be uncovered and that when one fact is subtracted there remains that much less to investigate. But there is no such limit. The uncovering of one fact or phenomenon only discloses another. There are no remainders. The field is limitless."

To one who thus comprehends the situation the Garden's appeal for $500,000 for research will be regarded as a conservative request.

A. Cressy Morrison Prize

The project of disease resistance in plants has been continued by Dr. Reed and his assistants along the lines initiated by him in 1921. Two papers were published as Botanic Garden *Contributions,* and a third paper, to be published in 1928, was awarded by the New York Academy of Sciences, the A. Cressy Morrison

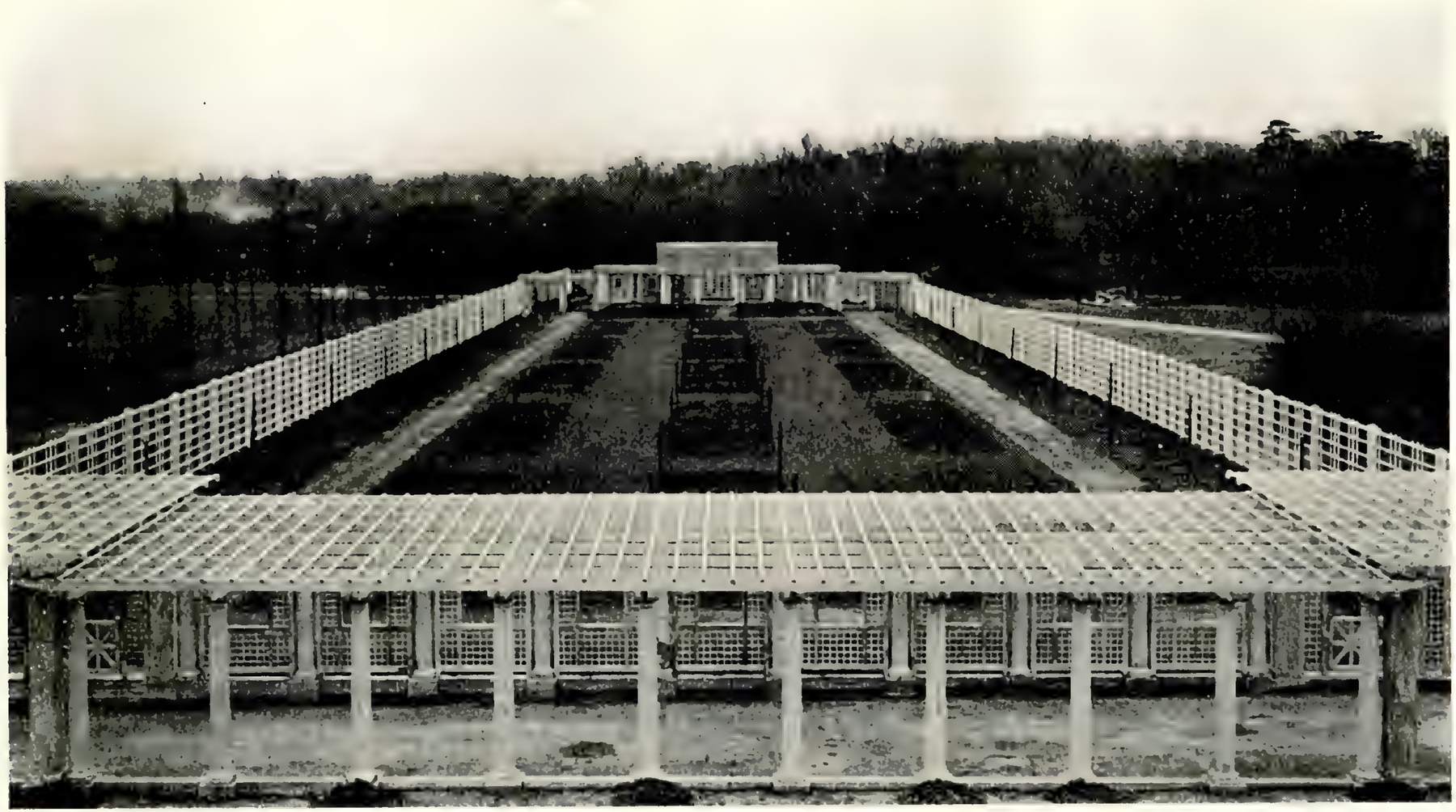

FIG. 3. Rose Garden. View December 30, 1927. (6395.)

Prize for the most acceptable paper in a field of science covered by the Academy or an Affiliated Society. The title of the paper was, *The inheritance of resistance of oat hybrids to loose and covered smut.* This will be published in the *American Journal of Botany* for February, 1928, as Brooklyn Botanic Garden *Contribution* No. 55.

Non-technical reports of the year's investigations are given on pages 43–59 following.

School Service

Quantity and Quality

Every educational agency, from Kindergarten to University, has shown astounding numerical increases since the close of the World War. There is often a tendency to confuse size with quality, but there is no inherent merit in larger figures. The steady and fairly rapid increases in attendance figures at all of our educational functions during the past few years are reported as a matter of record, and as an indication that there is a large and increasing public demand for the services of a botanic garden in this locality. There are also, in these figures, definite indications of certain needs in the way of equipment and personnel.

Since attendance at all of our educational offerings is wholly voluntary, it is a fair inference that the attendance would not increase nor attain impressive figures if the work offered did not possess elements of merit and meet a real need. It is, therefore, a significant fact that teachers in 1927, brought to the Garden 525 classes comprising over 32,000 pupils; that 670 teachers consulted with members of our staff during the year, concerning classroom problems affecting over 21,000 pupils; that study material (mostly of living plants and plant parts) was supplied to nearly 3,000 teachers in quantity sufficient for the instruction of over 109,000 pupils; that over 700,000 packets of seeds were supplied to over 260,000 pupils for planting in school and home gardens; and that over 25,000 living plants (largely raised by children of our own classes in our children's greenhouses) were placed in classrooms of 130 schools, not only for study, but to make the classrooms more attractive. All of these figures show substantial gains over a year ago as is shown in the following summary (Table I).

TABLE I

Statistics of School Service

	1927	1926
Conferences		
Number of Teachers	670	374
Number of Pupils involved	21,580	18,324
Loan Lectures (Lantern slides, etc.)		
Number of Teachers	26	28
Number of Pupils attending	2,174	10,116
Study Material Supplied		
Number of Schools and annexes		
High		
In Brooklyn (Total No. in Borough, including annexes, 33)	21	15
In Queens	6	5
In Manhattan	8	9
In other Boroughs	4	14
Junior High Schools (Total in Borough, 16)	12	12
Colleges, Universities, and Museums	8	6
Training Schools for Teachers	2	2
Elementary Schools (Total in Borough, 221)	66	*220
Private and Parochial Schools	22	18
Number of Teachers	2,995	2,450
Number of Pupils instructed	109,011	91,300
Exhibits provided		
Number of exhibits	9	7
Viewed by	11,200	4,600
Living Plants placed in schools		
Number of schools	130	119
Number of plants	25,251	14,712
Agar (sterilized) for class use		
Petri dishes	2,338	1,669
Flasks	10	6
Seed Packets for Children		
Schools	220	178
Teachers	5,626	5,575
Pupils	268,519	225,417
Packets	705,694	550,840
Meetings of Outside Organizations	23	45
Attendance at meetings of outside organizations	1,635	1,646

* The 1927 figure (66) indicates the number of different schools served; the 1926 figure indicates the number of requests received.

Model Lessons at Schools

The curator of elementary instruction, in her appended report, calls attention to the fact that, for the second consecutive year a request was received from one of the Public Schools (P. S. 36, Brooklyn) to have model lessons in Nature Study given in the presence of the regular teachers. This year, seven classes totaling 300 pupils were instructed at once, eight lessons being given in all.

Cooperation

Nurses Training School.—By arrangement with Miss Margaret S. Belyea, director of nursing, Prospect Heights Hospital and Brooklyn Maternity, a series of field lessons was arranged with the nurses training class of that hospital. The first meeting was on May 18. The instruction included those aspects of plant life related to the work of nurses, such as the life history and physiology of plants, the identification of officinal plants in the field, the use and care of potted plants and cut flowers in the sick room, and other topics. The course consisted of conferences, demonstrations, and field trips. This is an entirely new line of interest in botanical instruction. So successful was this first year's course, that plans have been made for its continuance and it has been included as one of the regular courses announced in our *Prospectus* for 1927–8.

Brooklyn Home for Consumptives.—For several years the Garden has supplied seeds and gardening advice to this Home for the gardens of the child patients. The cooperation was continued for 1927. One of our instructors usually goes to the Home to assist the children in planting.

High School of Commerce, Manhattan.—In October this school began the organization of a Commercial Museum, and also, as a part of its twenty-fifth Anniversary Celebration (October 24–29), planned a special exposition to show the progress that has taken place in commercial and industrial fields during the past 25 years. As a loan, the Garden sent specimens of various varieties of corn (such as sweet, pop, flint, and dent), and as gifts, dried specimens of whole plants of wheat, oat, barley, rye, sorghum, broom-corn, and millet. This material was all a by-product of our research work. The exhibit was viewed by about 6,500 persons.

Plantations and Grounds

Inadequate provision for labor made it necessary during 1927 to confine the work on the grounds largely to maintenance of lawns and cultivated areas. The entire north addition of several acres, fronting on Eastern Parkway, still remains in furrow now for the thirteenth year. Further development of the plantations, involving numerous much needed additions and extensions of exhibition material, must be postponed until more gardeners and laborers are available.

For maintenance, new development, and guard duty over 50 acres of intensely cultivated garden and lawn, including a nursery and experimental plot, and also a range of public conservatories, educational greenhouses, and propagating houses we have only two foremen gardeners and five gardeners, and a force of unskilled laborers, varying from only four or five for most of the season, to fourteen for about seventeen weeks (April 11–August 6).

Every year sees a steady gain in the labelling of the collections. Upon this depends, in large measure, their educational value. Details concerning our method of making labels have been supplied to other institutions on request during the year.

International Seed Exchange

In our *Delectus Seminum, 1925* (published in January, 1926) we offered seeds of woody plants only. The 1926 List (published in January, 1927) included only seeds of herbaceous plants. Spores of 39 species of Ferns, and seeds of 579 Dicotyledons and 82 species of Monocotyledons, a total of 700 species were offered. Of these, 2,408 packets were sent to 88 institutions in 26 countries, and 797 packets were received in exchange, from 50 institutions in 20 countries.

International Seed Exchange, Communication No. 8, dealing with the question of possible international uniformity in the names of plant families and genera used in the seed exchange lists, was published in October, 1927. This *Communication* was accompanied by a brief questionnaire, soliciting expressions of opinion on various points. The answers being received are of interest and significance, and are practically unanimous in expressing the desirability and hope of the possibility of international uniformity.

It is planned to publish these replies early in 1928, as *Communication No. 9.*

Conservation of Native Plants

In the Annual Report two years ago, it was noted that about 1,000 young plants of the rare Hart's Tongue Fern (*Scolopendrium vulgare*), were being raised, and that it was proposed to use these in an experimental attempt to establish this rare species more widely throughout the country, as a demonstration of one important constructive measure for saving a species threatened with extinction in the United States. Such distribution of small plants was made in 1926 and during 1927 to correspondents widely spread in the United States. There still remain available for distribution a few dozen of the sporeling Hart's Tongue Ferns.

In addition, there were added to the collections of lantern slides during the year, photographs of Hart's Tongue localities which could not now be duplicated. This applies especially to photographs in the neighborhood of Green Lake, east of Jamesville, N. Y., where quarrying operations in the last few years have very materially changed the landscape, with the destruction of some of the best colonies of Hart's Tongue.

Library

Accessions.—As noted in the appended report of the librarian, over 7,800 publications were received and accessioned during the year, including over 600 books, over 600 pamphlets, and over 6,600 parts of publications.

Current issues of 870 periodicals dealing with various aspects of plant life were received.

Binding.—Toward the close of the year a special gift of $2,000 made it possible to begin on the great amount of binding that has been accumulating for several years. A special, trained assistant was secured for the month of December, and the librarian reports that some 600 volumes were sent to the binder before the close of the year. The work will be continued during the first part of 1928.

The gift that made possible this work was one of the most timely ever received by the Garden, for the need of binding was

large and urgent. If some 800 periodicals are received by a library each year that alone means an annual binding item of 800 volumes. To this must be added a considerable amount of rebinding each year.

Attendance.—The attendance was nearly 7,400 as against over 7,100 in 1926, and 1,319 publications were circulated among members of the staff for use in the building.

Bibliographic Work.—The number of questions received and answered increases each year. Every Borough in the City was served in this way in 1927, and the number of questions received from outside of the City steadily increases. It not infrequently will take an entire forenoon to secure and forward the information asked for in only one question.

To render this service is one of the purposes for which the library exists, and such use of it is welcomed and encouraged, but administratively it must be recognized that this consumes time and tends to create the need for additional personnel. There is need of two full time assistants, in place of one and a half as at present.

Herbaria

ACCESSIONS

Phanerogamic (including Bryophytes and Algae)	1,176
Mycological	467
Total	1,643
Specimens sent in exchange	210

Phanerogamic Herbarium

As noted in the preceeding report, further expansion of the Phanerogamic Herbarium is now practically impossible (except by inactive storage of specimens) until additional herbarium cases are provided. As soon as funds can be secured a mezzanine floor should be provided in the main herbarium room similar to that in the main-floor stack room of the library. That would double the present capacity for herbarium cases.

Mycological Herbarium

Very few additions were made to the mycological herbarium during the past year. Two fascicles of *Fungi Dakotensis* con-

taining 55 specimens, issued by Dr. J. F. Brenckle, 4 fascicles of *Fungi exotici* containing 200 specimens, issued by Dr. H. Sydow, and 30 specimens of *Ustilagineen Europas,* issued by Dr. A. Zillig, were purchased. Dr. H. Poeverlein, of Speyer, Germany, sent us 182 speciments of rusts and smuts. In exchange, we forwarded to him 210 specimens of fungi belonging to the same groups.

Conservatories

The conservatories have, for several years, been planted to capacity and have now become largely a problem of maintenance of plants and labels.

The attendance has greatly increased over that of one year ago, being over 35,500 as against over 27,000 in 1926, a gain of 24 per cent.

Thirteenth Annual Spring Inspection

The thirteenth annual spring inspection was held on May 10. Approximately 900 were present—a somewhat smaller attendance than a year ago, due to the very threatening weather that prevailed until about 2 p.m. At that time the clouds and fog broke, and the weather was really ideal throughout the afternoon. The indoor feature was an exhibit of living plants and other material illustrating various phases of research at the Garden. A special *Leaflet* (Series XV, Nos. 5–7, May 18) was issued as a guide to this exhibit.

As usual, the exhibit was in charge of the Woman's Auxiliary, of which Mrs. Glentworth R. Butler continues as chairman. The chairman of the special committee for the inspection was (for the second year) Mrs. James M. Hills. It is a pleasure again to express cordial appreciation of the efficient and important services of this committee and the other members of the Auxiliary, and of numerous gifts of refreshments and of flower containers and other appointments needed in connection with serving so large a company of guests.

Gifts

In addition to gifts just noted in connection with the Annual Spring Inspection, the Garden wishes to express its lively appre-

ciation of the generous gifts recorded on pages 105–111. Far beyond their timeliness and value is the assurance they bring that the Garden has a large body of loyal and actively interested friends. The realization of this puts perennial heart and buoyancy into all of our work.

Woman's Auxiliary

On March 29, at the Laboratory Building, the Auxiliary gave a tea to its members and their friends. Illustrated talks were given by Miss Shaw, curator, on the work of the Department of Elementary Instruction; and by Miss Loines, chairman of the Governing Committee, on American Gardens.

In connection with the House Plant Competition, organized at the Women's Exposition of Arts and Industries on October 8, the Woman's Auxiliary have offered to give three prizes of $20, $10, and $5 for the first, second, and third best plants exhibited.

The Exhibit of Winter Bouquets, on December 11–16, under the auspices of the Auxiliary, is mentioned in detail on page 33.

Membership

The list of members (1166, as of March 27, 1928) is given on pages 131–145.

Unseasonable Weather and Flowering

The unseasonable high temperature of November reached a maximum of 70° F. on the 12th, 16th, and 23d, with a mean of maximum temperatures of 55.4° F. which was 4.4° F. above the normal of 51.0° F. for the month. The mean minimum temperature for the month was 41.8° F., or 4.5° F. above the normal of 37.3° F. Thus, the mean temperature for the month (the average of the extremes) was 48.6° F., or 4.4° F. above normal. This was near the high record for the mean for November. The result was that many shrubs came into unseasonable bloom, including: Forsythia, Japanese Witchhazel (*Hamamelis japonica*), Swiss Heath (*Erica carnea*), and Scotch Broom (*Cytisus scoparius*).

The following herbaceous plants flowered during November:

Sea Pink (*Armeria juncea*), Evergreen Candytuft (*Iberis sempervirens*), *Muhlenbeckia nana,* European Groundsel (*Senecio adonidifolius*), *Achillea ageratifolia,* one of the Houseleeks (*Sempervivum tectorum*), *Potentilla nepalensis* var. Miss Wilmot, and the Central European Cinquefoil (*Potentilla alba*). Dandelions and the two common Chickweeds (*Cerastium vulgatum* and *Stellaria media*) bloomed throughout the month.

Public Exhibits

International Flower Show

An award of merit was given to the Botanic Garden for its exhibit at the Fourteenth International Flower Show, at the Grand Central Palace, March 21–26. The first exhibit of the Garden at the Flower Show was in 1918, and no subsequent exhibit was made until 1927. This exhibit was devoted to a display of epiphytes ("air plants"), including orchids, bromelaids (Pineapple Family), aroids, cacti, ferns, mosses, algae, and lichens, arranged in a naturalistic setting. As the exhibit was not entered in a competitive class, an award of merit was the highest recognition to which it was entitled. A special *Leaflet,* entitled *Epiphytes and House plants,* was issued as a guide to the exhibit, and distributed in large quantities at the Show, as was also a revised edition of the *Leaflet* on *The Wardian Case.*

Members of staff were in attendance each day and evening, and many inquiries were received at the exhibit and also subsequently by mail. The exhibit was planned by our horticulturist, Mr. Free, and installed by our own gardeners under his supervision. Many commendations were received for its artistic merit and educational value. The Garden is under obligations to the Garden Club of America for their generous allotment of space.

Women's Exposition of Arts and Industries

For the second year the Botanic Garden installed a booth at the Annual Women's Exposition of Arts and Industries. (This was the Sixth Exposition.) The account of the Exhibit in the *Brooklyn Daily Eagle,* for October 8, stated that, "From the educational standpoint the Botanic Garden and the League of Women Voters might be considered leaders."

The Botanic Garden exhibit included a model of our Children's Gardens, made to scale by Miss Kathryn Clark, instructor. Miss Shaw gave an informal talk each day on Garden topics.

Winter Bouquets.—Our third exhibit in the interest of conservation of native American plants, especially Mountain Laurel, Holly, and Groundpine, was held December 11–16 at the Laboratory Building, in charge of the Woman's Auxiliary. There were daily exhibitions, by members of the Boys and Girls Club, of their Christmas activities and work, including the making of numerous Christmas gifts out of plant materials, the raising of plants to flower at Christmas time, and the making of Bayberry candles from wax obtained from the Bayberry (*Myrica cerifica*). A special *Leaflet* entitled, *What Price Christmas Greens?*, was published and distributed in this connection and received widespread newspaper notices. In this *Leaflet,* by the curator of public instruction, Dr. Graves, it was urged that the most satisfactory solution of the problem of conservation of Laurel and Holly, will be to grow and market them as crop plants. This solution, however, will not apply to Groundpine (*Lycopodium*), as it cannot, as yet, be raised satisfactorily in large quantities by artificial culture, and so far, for the present at least, its use for ropes and wreaths. at Christmas time should be discouraged.

Dr. George W. Brush

Dr. George Washington Brush, a trustee of The Brooklyn Institute of Arts and Sciences since February 1911, died suddenly on November 18, 1927, at the age of 85 years. As a physician Dr. Brush was for a time a member of the Board of the Long Island College Hospital and a consultant at the Bedford Hospital and Dispensary. In 1861 he enlisted in the Forty-eighth New York Volunteers and served throughout the entire Civil War, being mustered out with the rank of Captain. In 1864, at the age of 22, he aided in the rescue, under fire, of 400 soldiers on a troopship stranded in the Ashepoo River, South Carolina, and for conspicuous bravery in this connection he was, shortly after the close of the war, awarded the Congressional Medal of Honor.

It was Dr. Brush who, while State Senator (1896–1899), introduced in the Legislature of New York State, in 1897, a bill

"to provide for the establishment of a botanic garden and arboretum on park lands in the city of Brooklyn, and for the care of the same." This bill, which became a law on May 18, 1897, secured the setting aside, for botanic garden purposes, of the major portion of the land now occupied by the Brooklyn Botanic Garden, not including what are now known at the Garden as the north and south additions.

It was provided in this *Act* (Laws of New York, 1897, Chapter 509) that the Garden should be laid out and administered by the Park Commissioner of the then City of Brooklyn, and that the grounds should be so laid out as to serve "as a proper approach to the Museum building of the Brooklyn Institute of Arts and Sciences." This was in accordance with suggestions of the late Prof. Franklin W. Hooper, the director of the Institute.

It was Mr. Alfred T. White, "father of the Brooklyn Botanic Garden" who suggested, about nine years later, that the proposed Garden be administered by the Trustees of The Brooklyn Institute of Arts and Sciences, and the *Act* of 1897 was amended by the *Act* of May 24, 1906 (Laws of New York, 1906, Chapter 618), and again by the *Act* of May 20, 1911 (Laws of New York, 1911, Chapter 178), so as to provide for the administration of the Garden by The Brooklyn Institute of Arts and Sciences, whenever the Institute should raise "by private subscription the sum of fifty thousand dollars within one year from the passage of this act, the principal of which or the income thereof to be set apart and used by said institute for the purchase of plants, flowers, shrubs and trees, or for other purposes in connection with said botanic garden and arboretum. . . ." This sum was secured by Mr. White, and thus, through the combined services of Professor Hooper (who first suggested the idea of a botanic garden on the present site), of Dr. Brush (who secured the enactment of the necessary legislation), and of Mr. White (who proposed that the Garden be administered by the Institute and who secured the necessary initial funds), the Garden was finally launched, the contract or *Agreement* between the City and the Institute being executed on December 28, 1909, at the close of the Mayoralty of Hon. George B. McClellan.

FIG. 4. Japanese Garden. White-flowering Cherry at entrance to Tea House. April 25, 1927. (6202.)

Resignations and Appointments

Resignations

Elizabeth H. Hemstreet, office assistant since April 25, 1927, resigned July 6.

Konstanty Marshlewski, gardener from March 25, 1915 to March, 1917, foreman gardener since 1917, resigned May 14.

Jeanette M. MacColl, A.B., secretary to director since September 15, 1926, resigned September 1.

Edith R. Daly, library assistant since October 1924, resigned October 1.

Mary Ellen Peck, M.A., research assistant since September 1, 1925, resigned October 1.

Helen Smith Hill, library assistant, February, 1919 to December 1, 1921, curatorial assistant since 1921, resigned October 15.

Marion Gibbs Green, office assistant since February 1, 1922, resigned November 5.

Dr. Orland E. White, curator of plant breeding and economic plants since 1924, resigned as of October 1, to accept an appointment as professor of agricultural biology and director of the Blandy Experimental Farm, at the University of Virginia. Dr. White was a member of the staff as assistant curator of plant breeding from 1913 to 1915, as curator of plant breeding from 1915 to 1924, and curator of plant breeding and economic plants from 1924 until his resignation. During September Dr. White attended the International Genetics Congress in Berlin.

Appointments

Alexandra Dodd, curatorial assistant, February 14.
Maud H. Purdy, curatorial assistant, March 7.
Elizabeth H. Hemstreet, office assistant, April 25.
Clement G. Agate, foreman gardener, May 16.
Mrs. Emilie Perpall Chichester, library assistant, Sept. 1.
Zelda J. Sargent, instructor, October 1.
Dorothy Barnett, curatorial assistant, October 24.
Ruth Wyllie, office assistant, October 24.
Caroline Mary Donald, secretary to the director, October 29.
Mrs. Gladys Glenn Zunser, library assistant, December 7.

Miscellaneous

Wreath on Audubon's Bust.—On invitation from Dr. Robert Underwood Johnson, director of the Hall of Fame, New York University, the Garden placed a wreath at the base of the bust of Audubon, which was unveiled at the Hall of Fame on May 6.

Lindbergh Day.—June 16 was "Lindbergh Day" in Brooklyn. As the parade was to pass by the Garden on Flatbush Avenue, it was deemed advisable not to open the Garden at all until the parade had passed. This was to avoid the trampling of vegetation on the Flatbush Avenue border mound. The gates were opened at 2:15, after the parade had passed.

Participation in Sargent Services.—The Brooklyn Botanic Garden was honored by representation on the Honorary Committee for the memorial services in honor of the late Professor Charles S. Sargent, for over 40 years director of the Arnold Arboretum. The exercises were held at the Arboretum on June 8. The committee was international in character, and composed of representatives of botanical and horticultural institutions and organizations.

European Trips.—Dr. Gundersen, curator of plants, who had been in Europe and Great Britain since August, 1926, returned February 1. A report on this trip will be found on pages 76–78.

On July 16 the director sailed on the S. S. Caronia to make an inspection of European botanic gardens, and to confer with foreign botanists and publishers on various aspects of the work of the Botanic Garden. The trip included about 20 gardens and other botanical institutions in England, Scotland, France, Switzerland, Germany, Netherlands, and Belgium. Numerous arrangements were perfected for exchange of material and publications, and the personal contacts established during the trip will be of material advantage to the Garden in its further development and its articulation with foreign institutions.

A special study was made of the world-famous rose garden, the *Roseraie de l'Hay les Roses,* near Paris, and other rose gardens, in connection with the development of the new Rose Garden at Brooklyn.

Guest Tickets.—Certain courses of instruction for adults have become so popular that it has been necessary to issue guest tickets,

at a nominal fee, for those who may wish to attend any one or more, but not all, of the sessions of the class.

Mr. Free's early spring course on "The Flower Garden," for adults, was announced as limited to 40, because of restricted space for practical work in the instructional greenhouse, but 88 men and women applied for admission, and so the class was organized in two sections. The course continued for five weeks, beginning February 17.

Financial

Tax Budget Accounts

The initial Tax Budget appropriation for 1927 was $87,948, an increase of $459 over 1926. This was supplemented by an additional appropriation of $1,640.63, making the total $89,588.63. The amount requested was $116,655 which was the amount urgently needed in order to insure proper maintenance of buildings and grounds, and to meet the rapidly increasing demands for public service.

The grounds are suffering in appearance, and in places are positively unsafe for lack of repairs which cannot be made for lack of funds. For example, there are several flights of wooden steps, constructed ten years ago with no thought except that they would be temporary for a year or two. It has been necessary to tear down one of these and close the paths leading to them from both directions. The Japanese Garden is in need of extensive repairs and replacements.

Our service to the public schools of Brooklyn has more than doubled during the past few years, and has been extended to include all five Boroughs without any corresponding increase in appropriations for school service.

In previous reports (and also above, on page 27) I have called attention to the undeveloped area of about three acres of the North Addition, fronting on Eastern Parkway. When this tract was added to the Botanic Garden in 1912 there were no buildings on the opposite side of the Parkway; now that side of the street is built up solid with high class apartment houses. This, and the increasing vehicular and foot traffic on the Parkway, have combined to make the Eastern Parkway gate one of the most used entrances to the Garden. The development of this area, still under the plow, becomes increasingly urgent.

Private Funds Accounts

The Private Funds Budget for 1927 was $116,677.99, an increase of $50,499.39 over 1926. Of this amount, $53,261.18 was derived as income from permanent funds, all of which are restricted by terms of gift or bequest to the scientific and educational work of the Garden, and are thus, not available for maintenance.

The percentages of the budget derived from public and private funds during the three years 1925–1927, are as follows:

	1925	1926	1927
Tax Budget	58%	57%	43%
Private Funds	42	43	57

Since 1925 the Tax Budget Appropriation has increased $2,099 (from $87,489 to $89,588 for 1927), or 0.2 per cent.

During the same period the Private Funds Budget has increased $61,142 (from $55,536 to $116,678, in 1927), or 110 per cent.

Distribution of the Budget for 1927

As was pointed out in the Botanic Garden RECORD for July, 1927, the total 1927 budget of $192,546 * was distributed among the four major activities of the Garden as follows:

For Research	For Education	For the Library	For Administration and Maintenance
$37,700 20%	$74,118 39%	$12,224 6%	$68,498 35%

The percentages for the first three items, especially that for research, are too small, and should be increased by additional endowment restricted to scientific and educational work.

* The exact figures, based on the appended Financial Statement (pages 96–104), depart somewhat from those given in the RECORD for last July which were based on data available in June 1927; here the item of $10,000 for the new Rose Garden, and a contribution of $2,000 for the Library have also been added to the total for education.

Salary Injustices

Since the World War no subject has been more insistently presented by the administrative heads of scientific and educational institutions than the subject of adequate salaries. This should continue to be the case until the question is solved and solved right. Such is not the case at the Brooklyn Botanic Garden, especially with the personnel of the maintenance force. Practically all of these men are receiving inadequate salaries, and less than is being paid elsewhere in the City and by the City for similar services. Every possible effort should be made, without delay, to secure proper compensation for these men, many of whom have given the Garden several years of service, and all of whom are entitled to compensation commensurate with the cost of living and with what is being paid elsewhere.

In the matter of the salaries for our scientific and educational staff we come into competition with the best universities and research institutions. According to statistics collected by the Institute of Public Service, and published in 1927, few colleges in the United States today pay adequate salaries to their faculties, and the average income of the teaching staffs of some 300 colleges and universities is less than the wages of skilled labor. But the Botanic Garden should not be satisfied to compare itself with the average, in this or in any other matter. We should not rest content until salaries for our scientific and educational (as well as for our administrative) staff are as good as the best afforded elsewhere. Only then can we hope to secure and retain the most efficient personnel for the important work we have in hand.

Needs

Endowment for Research

Without attempting to list the various needs for the Garden, several of which are urgent, and most of which have been enumerated in preceeding annual reports, special attention is called to the necessity of providing for the continuation of our plant pathology project, and related lines of research after the close of 1928.

In the Annual Report for 1919 the need of additional provision

for research, especially in plant pathology, was set forth in some detail and, as a result of this, Mr. Alfred T. White, then chairman of the Governing Committee, made a pledge of $50,000 to initiate this work, the principal sum to be expended over a period of not less than four years. By certain economies the funds were made to carry the work for five years.

Before the expiration of the fifth year three other friends of the Garden, after having assurances from the National Research Council as to the value and need of this work, pledged annual contributions sufficient to continue the project for three years more, or until the close of 1928.

The investigations made possible by these pledges have yielded results of first importance to both pure and applied science. As noted elsewhere in this Report, one of the papers embodying some of the results of this research, was, in December, 1927, awarded the A. Cressy Morrison prize of the New York Academy of Sciences "for the most acceptable paper in a field of science covered by the Academy or an affiliated Society."

The results obtained and the great importance of this field of research fully justify this appeal for an endowment fund to place the work on a permanent basis, and provide for its natural and logical expansion along the lines of the new problems such as fruitful research always opens up.

The director will be glad to submit to anyone interested detailed plans and a program showing the need of an annual income of not less than $27,500. Even if this goal cannot be realized before the close of 1928, some provision should be made to insure the continuation of the work until such time as an adequate endowment for it can be secured.

Appended Papers

Reports on research for 1927, administrative reports of members of staff, the financial statement, Appendices 1–7, and a list of officers and members of the Garden, follow as an integral part of this report.

Respectfully submitted,

C. Stuart Gager,
Director.

FIG. 5. Portion of exhibit at Spring Inspection, 1927, to illustrate the sequence of Plant Families according to Jussieu, 1789 (top row), Bentham and Hooker, 1862–83 (middle row), and Engler, 1889–1900 (bottom row). In each row the same twenty families are represented, each by a flowering or leafy branch from a plant belonging to that family. Note, for example, the different positions of the Magnolia (M). (6200.)

REPORTS ON RESEARCH FOR 1927

Plant Pathology

By George M. Reed

The Inheritance of Smut Resistance in Oats

The studies on the inheritance of oat smut resistance have been continued. The behavior of the progenies of various hybrids with reference to both the loose (*Ustilago Avenae*) and covered (*U. levis*) smuts has been determined.

In the last annual report a brief statement regarding the behavior of the second generation plants of a cross between Black Mesdag and Hull-less was given. One of these varieties (Black Mesdag) is highly resistant while the other (Hull-less) is completely susceptible to both loose and covered smut. As reported last year, 465 second generation plants belonging to four different families were inoculated with loose smut and 107 (23 per cent.) were infected; 196 plants were inoculated with covered smut and 40 (20.4 per cent.) were infected.

During the past year, data on the third generation of these progenies were obtained. A total of 578 third generation families were grown, each family containing on the average about 36 plants, half of the individuals being inoculated with loose smut and the other half with covered. It was determined that 531 of these families were readily classified as either resistant, segregating or susceptible to both species of smut. The remaining 47 families gave a dissimilar reaction, but whether this indicates a real difference in the inheritance of the resistant quality in these families or merely accidental variations in these experiments remains to be determined. In general, a third generation family resistant to one smut is resistant to the other, and a family susceptible to one is susceptible to the other.

In general, the behavior of these families corresponds with the data obtained in the second generation and seems to correspond with the interpretation that resistance to smut is dominant and segregation of resistant and susceptible individuals occurs on the basis of a typical three to one ratio.

The second generation of a cross between Silvermine and Black Mesdag was studied during the past year. Silvermine is very susceptible to both smuts, while Black Mesdag is equally resistant. The progeny of two different crosses was grown and 95 plants were inoculated with *Ustilago Avenae,* of which 17 (17.8 per cent.) were infected. In a similar series 89 plants were inoculated with *U. levis* and of these 15 (16.8 per cent.) were infected.

The second generation of crosses between Hull-less and Victor, varieties susceptible to both smuts, and Early Gothland, a variety susceptible to loose but resistant to covered smut, were also studied. The second generation plants of the cross between Early Gothland and Victor gave 100 per cent. infection when inoculated with *U. Avenae,* a result that might be expected on the basis of the high susceptibility of both parents to this smut. On the other hand, out of 44 second generation plants inoculated with *U. levis,* 8 18.1 per cent.) were infected. In the same way, second generation plants of two progenies between Early Gothland and Hull-less were studied. In the series inoculated with *U. Avenae* 93.4 per cent. of the plants were infected, while in the series with *U. levis* 39.3 per cent. were infected, 94 plants being grown.

The converse of this cross was also available for study. In this case one parent (Hull-less) was susceptible to both smuts while the other (Monarch) was susceptible to *U. levis* but resistant to *U. Avenae.* The second generation plants of four progenies of this cross were available for study. The plants inoculated with *U. Avenae* gave 20.9 per cent. infection, a total of 196 plants being grown. On the other hand, out of 100 plants inoculated with *U. levis* 95 per cent. were infected.

In all these crosses between a resistant and a susceptible variety resistance to smut appeared to be the dominant character, while susceptibility was recessive. Further, segregation in the second generation appeared to occur on the basis of a single factor difference. While extensive studies have not as yet been made on the inheritance of the morphological characters of the oat varieties, yet the evidence points to the conclusion that the recombination of smut resistance with the various morphological characters may be successfully accomplished.

A number of new crosses between different oat varieties were

made. These are of special interest because of the possession of the quality of susceptibility or resistance, and studies with the second and later generations should give further light on the general problem of the inheritance of the resistant quality.

Physiologic Races of Oat Smuts

In the last Annual Report an account was given of the specialized races of *Ustilago Avenae* which characterized the Fulghum and Red Rustproof varieties. Two distinct races were differentiated, one the Fulghum race and the other the Red Rustproof race. Further experiments have been carried out with these races and the earlier results have been confirmed. Additional collections of both *U. Avenae* and *U. levis* have been secured and these have been tested on several varieties of oats. Evidence of new races of both species of smut has been obtained.

Physiologic Races of Bunt of Wheat

Bunt of wheat is a common and wide-spread disease of this crop, being co-extensive with its cultivation. There are two distinct species of smut (*Tilletia laevis* and *T. tritici*) which cause the disease. They are very similar in their life history, but are readily distinguished by microscopic examination of their spores. In our earlier work on varietal resistance a large number of different wheats, mainly winter types, have been tested in order to determine their susceptibility or resistance. Definite collections of both species of smut were used. By far the larger number of common American winter types have proved to be susceptible.

Our later studies have been mainly concerned with the problem of the possible existence of physiologic races of these smuts and, in earlier reports, announcements have been made regarding definite evidence of the occurrence of such specialized races. During the past year a more extensive series of experiments was carried out with a few winter wheat varieties. These were inoculated and sown in the fall of 1926 and harvested in the summer of 1927. The varieties were selected on the basis of their previous behavior to the various collections of smut.

Twenty-one different collections of *T. laevis* were used, nine of

these being sown on eighteen varieties and the remainder on ten, and definite evidence of specialization was obtained. At least four distinct races were differentiated on the basis of the behavior of the collections on such varieties as Hussar, Martin, Odessa, Kanred and Turkey. It is possible that the actual number of races is greater, but the varieties grown during the past year were not sufficient for a clear differentiation.

Similarly, twenty-one collections of *T. tritici* were used, nine being sown on eighteen varieties and the remainder on ten. Again clear-cut evidences of the occurrence of specialized races were obtained and the results of previous years confirmed. Again the varieties Hussar, Martin, Odessa, Kanred and Turkey served as differential hosts, and at least six races were clearly defined.

It is evident from these results that both species of the bunt of wheat, like the two smuts of oats, the covered smut of barley, and other smuts, are differentiated into well defined physiologic races. The existence of such races greatly complicates the problem of successfully breeding resistant varieties, and their occurrence must be recognized before real progress can be made.

It is also necessary to keep clearly in mind the importance of environal conditions on the infection of wheat by bunt. Soil temperature, soil moisture, soil reaction, etc., are extremely important in influencing the extent of the infection.

The most important results on these problems have been prepared for publication and will be issued from the press early in 1928.

Physiologic Races of Covered Smut of Barley

In previous reports the interesting results on the covered smut of barley (*Ustilago hordei*) obtained by Dr. James A. Faris, Resident Investigator in Plant Pathology in the Brooklyn Botanic Garden (1921–4), have been mentioned. Dr. Faris clearly proved the existence of specialized races of this fungus, which were identified by their capacity for infecting certain varieties of barley. Additional studies have been made with the races originally differentiated, together with new collections of smut from other localities.

No attempt has been made as yet to determine the behavior of a

large number of varieties of barley to the different races. However, it seems clear that some races of the smut are confined to a relatively few varieties. The races originally designated as "Hannchen" and "Nepal" races seem to belong to this class. It is quite evident that the "Hannchen" race will not infect Nepal, nor will the "Nepal" race infect Hannchen. There are, however, other races which seem to be capable of infecting a much wider range of barley varieties, one, for example, which appears to be capable of attacking both Hannchen and Nepal. It is also true that some varieties of barley seem to be susceptible to many different races of covered smut.

The Inheritance of Resistance in Sorghums to Covered Kernel Smut

The studies on the inheritance of resistance of certain crosses between sorghum varieties to covered kernel smut (*Sphacelotheca sorghi*) were continued. Additional second generation plants of the crosses referred to last year were grown, together with inoculated plants of both the resistant and susceptible parents. Two different plantings of each hybrid were made on two different dates, and the results obtained from the two sets of experiments varied rather widely.

The second generation plants of resistant Feterita and susceptible Sumac Sorgo gave 48.1 per cent. infection, 65 plants out of a total of 135 being infected. In another family of this same cross 34.6 per cent. of the plants were infected, or 53 out of a total of 153. The results with Sumac Sorgo, the susceptible parent, were considerably lower than in the previous year, only 49.2 per cent. of the plants being smutted, 67 being grown in the different series.

Three second generation progenies of new crosses between Feterita and Dawn Kafir were grown. Dawn Kafir is very susceptible to the covered kernel smut, in contrast to the resistant Feterita. In one progeny 41.6 per cent. of the plants were infected, in another 50.2 per cent. and in a third 46.3 per cent. The susceptible Dawn Kafir used in connection with the same experiments gave 65.1 per cent. infection.

Additional second generation plants of the cross between Stand-

ard White Milo and Blackhull Kafir were also grown. The number of infected plants was considerably lower than was obtained the previous year; a total of 129 plants were inoculated and 8 (6.2 per cent.) were infected.

The results suggest that in the crosses involving Feterita and Sumac Sorgo and Feterita and Dawn Kafir, susceptibility is dominant in the second generation. On the other hand, in the cross between Standard White Milo and Blackhull Kafir resistance is dominant. So far, we have not been able to completely overcome the difficulty encountered in securing the infection of the maximum number of susceptible plants—of the parent as well as of the hybrids. As noted from the data presented, the susceptible parent frequently falls far below the maximum amount of infection, and has proved quite variable in the different experiments in succeeding years. It would be much easier to interpret the results if methods could be devised for use on a large scale for securing the infection of all the susceptible individuals. However, it appears quite clear from our experiments extending over a period of several years that in some crosses resistance is dominant, while in others this quality is recessive.

Head Smut of Corn and Sorghum

Our earlier experiments on the head smut of corn and sorghum (*Sorosporium Reilianum*) dealt with the problem of possible physiologic specialization in the smuts collected on each of these groups of host plants. Extensive experiments were carried out, and clear-cut evidence obtained that the smut on sorghum is highly specialized to that crop, while the smut on corn is equally specialized to corn. Our results bearing on this problem have been published during the past year.

Some additional lines of investigation have been followed up. One of the main ones has to do with the duration of the susceptible period of seedlings, and also the bearing of the age of the spore-soil mixture on its capacity for infecting. A large number of combinations were made during the past year. Frequently 100 per cent. infection of the plants was secured. High infections were obtained using a freshly prepared spore-soil mixture and dry seed. A large number of smutted plants also occurred in the ex-

periments in which older spore-soil mixtures were used on seedlings with plumules as much as 2 to 2½ cm. long. It is evident that relatively large seedlings may be infected.

A series of experiments was also carried out to determine the effect of temperature. Relatively high infections were obtained at both 20 and 25° C. There was a falling off at 30 and 35°, but even at the latter temperature a considerable number of smutted plants occurred. The amount of infection, however, at the different temperatures, varied somewhat depending upon the moisture content of the sand or soil and also upon whether the seedlings were germinated in sand or in soil.

Forest Pathology

By Arthur Harmount Graves

Chestnut Bark Disease Investigations

This work was a continuation of that described in my report of last year, the problem being to determine the cause of the greater resistance of the root of the American Chestnut (*Castanea dentata*) as compared with the stem, to the bark disease caused by the fungus *Endothia parasitica* (Murrill) Anderson. The laboratory work of the experiments was carried on by Miss Hester M. Rusk, and the considerable amount of progress that has been made in the way of results is due largely to her assistance.

Although it had been assumed hypothetically that the greater content of tannic acid or tannin compounds in the root tissues was responsible for their greater resistance to the fungous growth, it was believed possible that such resistance might be due to the comparative lack of air (for it is well known that the fungus in question is an aerobe and therefore needs a good supply of air for its best development) or to some other factor of the environment of roots, which differs so markedly from that of the stems.

To get information on this point, *i.e.*, the cause of the greater disease resistance in the roots, three series of inoculations were made on wild chestnuts at Hamden, Connecticut, in each series on an equal number of roots, and trunks or shoots of the same tree. As noted in my last report, in each series, after inoculation, the roots were left in a different environment, as follows:

FIG. 6. *Tulipa Batalinii* (pale yellow), May 15. (5804.)

Series I. Left exposed to the air.
Series II. Covered with soil.
Series III. Covered with dead leaves.

After one year had elapsed, namely in the middle of September, 1927, a careful inspection of the inoculations was made. The results showed that where the roots had not dried out unduly due to exposure to the wind, the fungous growth was slight. Where the roots had become somewhat dried, the fungous growth was extensive.

In the belief that the presence of much water in the tissues of normal roots might have a deterrent effect on the fungous growth, inasmuch as the water would tend to shut out air, an experiment was now set up in the laboratory at the Garden, which would test this point, as well as the tannic-acid hypothesis. A set of 15 segments of healthy stems and roots of similar diameters was autoclaved and inoculated with the fungus.

The rather remarkable result, in view of all previous hypotheses, was that the fungus now grew and sporulated much more luxuriantly on the root segments than on the stem. This seemed to dispose of the tannic acid hypothesis once for all, unless, indeed, sterilization had changed the nature of the tannin compounds, making them less effective. It also disposed of the hypothesis that the greater amount of water in the root tissues may be inimical to the fungus on account of exclusion of air, for during the process of sterilization in the autoclave, both root and stem segments became pretty well waterlogged.

The experiment was now tried out again on the living material in the laboratory, where it could be under constant surveillance, segments of live roots and stems of similar diameters being carefully washed in bichloride of mercury (1–1000), rinsed 3 times in sterile water, stabbed and inoculated from a pure culture of *Endothia* in oat agar, and placed in sterile test tubes. Under these conditions the results paralleled those obtained in the field: in the majority of cases the fungus made only slight growth on the roots, but had an opposite effect on the stems. That the fungus was nevertheless present in the roots was proved by the presence usually of one or more tiny fruiting bodies around the inoculation stab, or from the characteristic discoloration. Some of these roots

have been sectioned and examined under the microscope to see if cork formation or something similar prevented the advance of the fungus in the tissues. So far nothing of the sort has been found, but a much more thorough examination should be made to warrant any definite statement.

Summarizing, the results of the work so far indicate that the greater resistance of the roots to the growth of the fungus is not due to their greater content of tannic acid; it is not due to the fact that roots are normally covered with soil and therefore have not such a ready access to the air as the stems; it is not due to the fact that roots contain more moisture than stems; nor does it appear to be due to the formation of some special cicatricial tissue by the root. We seem thus to be led up to the hypothesis that the resistance is *essentially a protoplasmic one,* bound up in some way with the nature of the living substance present in the cells of the roots, although it is possible that one or more of the factors named above is to some extent contributory.

European Larch Canker

A considerable amount of infection of the European Larch and other conifers by *Dasyscypha Willkommii,* the causal agent of the European Larch Canker, was reported in 1927 by Dr. Perley Spaulding and Mr. Paul V. Siggers of the Bureau of Plant Industry to be present in several places in Massachusetts. At the request of Dr. Haven Metcalf, Senior Pathologist in charge of the Laboratory of Forest Pathology, I visited one of these infections at Hamilton, Massachusetts, on August 2, and obtained a quantity of the fungus. Inoculation experiments with this material are now going forward, and a report will be submitted next year.

Maple Wilt

At the request of several residents of Brooklyn I have examined dying maple trees, which in every case were the Norway maple (*Acer platanoidcs*). The trouble seems to be due to the "maple wilt," caused by a fungus belonging to the genus *Verticillium.* Further work on the habits of this fungus and its life-history appears to be much needed.

Beardless Iris Project

By George M. Reed

Japanese Iris (Iris Kaempferi)

The established plants of Japanese Iris gave abundance of bloom during the past season, the first flowers appearing on several varieties on June twenty-sixth. The flowers continued daily until August first, when the last buds on two varieties opened. The material was very satisfactory for making comparisons between the different plants and, as a result, considerable progress was made in the description and identification of the varieties.

It has proved a difficult matter to correctly identify the Japanese Irises. The original descriptions are often not available and frequently lack sufficient detail for correct identification. Sometimes it is not even stated whether the variety is single or double-flowered.

There were several noteworthy additions to the collection of varieties during the past year. At the end of 1926, 29 varieties were received from Vilmorin-Andrieux & Cie. These came in the midst of winter, but were carried over in the greenhouse and coldframe and set out in the field in early spring. Practically every plant survived, and many of them bloomed during the current season. A collection of 37 varieties of Japanese origin was received from the Donard Nursery, Ireland. These reached us in very poor condition in May instead of in March. However, practically every variety has shown signs of growth and while the likelihood of bloom next year is not great, yet the plants are growing and in time will doubtless flower. The 18 new varieties of J. A. Kemp, Little Silver, New Jersey, were also obtained. John Lewis Childs, Inc. presented us with their collection of 21 newly named varieties.

During the fall all of the older established varieties were divided and transplanted to new beds. As far as possible, these were arranged for planting according to the color classification scheme previously worked out. It will thus be possible to observe next season the varieties of similar color growing close together.

A new set of experimental beds was started in the spring.

These are primarily concerned with tests of mineral fertilizers: Nitrate of soda, bone meal, acid phosphate, aluminum sulphate and lime. Ten different plots were laid out in which five plants of each of five named varieties were placed. No very obvious differences were observed during the course of the past season.

There are, however, a number of serious difficulties in such experimental beds. The divided plants grow very unequally, and thus the size and vigor of the plant may not be in direct response to the fertilizer at all. Seedlings would probably serve as better material. Here again, however, there is a very great difference in the vigor of the seedlings from the same planting. Probably the most that we can hope for is a very general indication as to the response of the plants to the different fertilizers.

A large number of Japanese Iris seedlings are now growing. The seed of many of these have been collected from named varieties, while others have come from crosses between two known varieties. A few bloomed this year, and next year we should have an abundance of flowers on most of these plants. Additional crosses have also been made between certain varieties.

Siberian Group

Due to the fact that the varieties of Siberian Irises were transplanted in the fall of 1926, the plants showed a lack of their usual vigor in height and size of bloom. The material accordingly was not very suitable for detailed study and illustration. By another year, however, these plants should be well established and afford excellent flowers. A few additions to the collection of varieties were made, Mrs. Frances E. Cleveland sending us some of her new named seedlings. A large number of seedlings, grown from the seed of named varieties as well as seed obtained from crosses, are being grown. Many of these should bloom during the coming season.

Miscellaneous Beardless Iris

Several species and varieties of the Spurian Group gave satisfactory bloom during the past year. A number of species, such *aurea, ochroleuca, spuria, ensata, Sintenisii, missouriensis, Forrestii, chrysographes, Wilsoni* and *versicolor,* are well established

and flowered. Considerable data have been obtained as to the possibility of crossing many of these species.

One of the most interesting features was the seedlings of various species. The seed was obtained from a variety of sources under an assortment of names, and most of the plants bloomed this year for the first time. A few of them corresponded with the name under which they were received. The majority, however, were identified as *Iris halophila,* and showed considerable variation in the size and color of the flower. While the individual flowers were small, yet the abundance of blossoms on the plants gave an interesting mass effect.

Miss Maud H. Purdy was able to make watercolor illustrations of a considerable number of varieties of Japanese Iris. In addition, she painted a number of the beardless species, since satisfactory material was available. We are getting a very good collection of watercolors showing the range of color and form in the Japanese varieties as well as excellent material illustrating the species.

Donated

Japanese Iris:

John Lewis Childs, Inc., Flowerfield, N. Y.	23	varieties
A. B. Bauer, Richmond, Va.	8	"

Siberian and Miscellaneous Beardless Iris:

Mrs. Frances E. Cleveland, Eatontown, N. J.	8	varieties
Mrs. Charles H. Stout, Short Hills, N. J.	2	"
Mrs. C. S. McKinney, Madison, N. J.	2	"

Purchased

Japanese Iris:

Donard Nursery Co., Ireland	37	varieties
J. A. Kemp, Little Silver, N. J.	18	"
John Lewis Childs, Inc., Flowerfield, N. Y.	10	"

Iris Diseases

A great deal of attention was given to certain diseases of the Japanese varieties of Iris. In our studies on these varieties we have lost a number of plants. These have suffered from a characteristic fibrous root rot, a disease which must be clearly distinguished from the rhizome rot so common among the bearded

Iris. This year the disease occurred in the usual amount, resulting in the loss of individual plants here and there in the beds. Sometimes an infected plant recovered, pushing out new roots from the rhizomes.

During the past year we have had a severe disease of the foliage. The most obvious symptom is the appearance of a rosy coloration on the upper side of the leaves, especially where they more or less clasp the stem or fold over each other. When the disease was severe and early the plant failed to bloom, frequently dying down more or less completely to the ground. If, however, the trouble appeared later, the flowers seemed to be normal, but as the season progressed the leaves became more and more severely injured.

Miss Marjorie R. Swabey has isolated a species of Fusarium with great regularity from these discolored leaves, which may be responsible for the diseased condition. A similar organism has been isolated from the fibrous roots, and it may be that the same organism is responsible for both conditions. Further work, however, is necessary to clear up these points.

Systematic Botany

The Classification and Evolution of the Frankeniaceae

The progress of research on the Frankeniaceae has been greatly aided by the appointment of Miss Maud Purdy as part time curatorial assistant for microscopic work and drawings. An article comparing Frankeniaceae and Caryophyllaceae was published in *Torreya* in June. The definite establishment of a relationship Frankeniaceae-Caryophyllacea would fix the systematic position of a number of families of herbaceous apetalous plants.

I have later been occupied with the study of the species of Frankeniaceae of North and South America. In North America there are three or four species, of which, *Frankenia Jamesii* and *F. Palmeri* have the somewhat unusual distinction of having never had any other names. In South America nearly twenty names have been given to what appears to be not over seven or eight species of Frankenia. *Frankenia peruviana* Schellenberg 1913 appears to be identical with *F. lignosa* Rusby 1910. Specimens of these plants have the unusual character of having about four

FIG. 7. *Tulipa Clusiana* (delicate white or lemon-yellow, with purplish black base), May 15. (5803.)

rows of ovules to each of the three placentae, otherwise very near *F. erecta* Gay. The importance of the characteristic of the division of the pistil in Chilian species appears to have been overestimated. There are difficulties in obtaining the necessary material; still I hope gradually to get the characters, distribution, and synonymy of American Frankeniaceae approximately cleared up.

Miss Purdy is also giving some time to making watercolor sketches for lantern slides showing the structure of flowers to illustrate plant families.

Genetics and Plant Breeding

The Genetic Analysis of Garden and Field Peas

By Orland E. White

Investigations on garden and field peas (*Pisum*) have been continued in 1927, along lines similar to those mentioned in previous reports. The work on the inheritance of cotyledon shape and color and their genetic relationships to other characters will be ready for publication in 1928. Data have been secured on the inheritance of a large number of other characters and their relationships to each other, particularly in regard to flowering time, flower-color, and height. Other investigations involved studies on the inheritance of purple, yellow, and green pod colors and their genetic relations with purple seed-coat color.

Studies of the Variation of the Boston Fern (Nephrolepis)

By Ralph C. Benedict

The collections of Boston Fern types in the public houses and in the experimental house have been continued along the lines of previous years: namely, the maintenance of the most important bud variations, and also of the sporeling types, together with a continuation of experimental testing of various forms of special interest.

Ferns from the Horticultural Point of View

Further experimental work along this line has been carried on. Studies have been made of types not now commonly used as house

plants, including additions to the photographic records of some of these ferns, showing typical specimen plants.

Ecology and Plant Geography

Flora of Long Island

By Norman Taylor

The publication of *Research at the Brooklyn Botanic Garden* last July makes it needless to outline projects in process. Work has been continued in all of them, but field work on the "Flora of Long Island" was reduced because of my work at Allegany State Park.

More than 2,000 records of Long Island plants, however, were gathered from the herbaria at Ithaca, Albany, and Cambridge, many of them of the greatest importance as being the only specimens upon which the Long Island occurrence of certain species is based.

At Allegany a study in physiographic ecology was carried on for eight weeks, the results of which are now in press.

Work carried out at Merrick and Fire Island Beach on salt tolerance of certain sand dune and salt marsh plants has been continued. Such studies seem of more theoretical than practical importance. But a very practical application of them is now under way at the Jones's Beach Causeway. The Long Island State Park Commission has appealed for help in stabilizing the material pumped out of the bay and spread over the marshes. Upon this the Boulevard will be built, but without some vegetative covering it would be buried by drifting sand. The problem is an interesting theoretical one as salt tolerance and sand tolerance are required in different degrees, depending upon the nature of the material and the time of its deposit.

REPORT OF THE CURATOR OF PUBLIC INSTRUCTION FOR 1927

DR. C. STUART GAGER, DIRECTOR.

Sir: I take pleasure in submitting herewith my report for the year ending December 31, 1927.

Registration at Entrance Gates

Perhaps one of the most striking facts to be recorded in the history of the Garden's development is the enormous increase in the number of visitors, as attested by the registration figures of the turnstiles at the entrance gates (see Table I). Since the turnstiles were being repaired in 1926, and therefore not in operation, no definite figures are available for 1926; but the increase from the 504,595 figure in 1925, to 1,013,293 in 1927, or more than double, is truly phenomenal.

When we seek for the causes for this rise, they are not hard to find, although one could hardly have predicted such remarkable results. To begin with, two large high school buildings have been erected within a little more than three years on Classon Avenue, within a short distance of the Garden. One, the Girls' Commercial High School, with now about 5,000 pupils, was opened December 15, 1924; while the other, the Bishop McDonnell Memorial High School, with now about 1,200 pupils, commenced class-work in September, 1926. The presence of these large institutions in such close proximity to the Garden cannot fail to increase the gate registration, both on account of the frequent classes that are conducted by their teachers and our curators in the Garden, and also from the fact that many of the pupils walk through the Garden on their way to and from school.

Another considerable factor is the increasing amount of publicity given to the Garden and its activities. In this connection, the remarkably successful campaign for the Rockefeller Endowment Fund in 1926 succeeded not only in the acquisition of the fund, but also brought the attractions of the Garden to the notice of many people who had hardly been aware of its existence. The donation of a fund by Mr. and Mrs. Walter V. Cranford for the new Rose Garden during the past year has had a similar effect.

A third element is surely the increasing beauty of the Garden itself. The famous European botanic gardens teach us that time is a most important *sine qua non* in the development of a botanic garden, and each year of time is an added asset to the Garden's potentiality for attractiveness. The magnificent displays of naturalized bulbs in the spring—crocuses, daffodils, narcissus, tulips, etc. have drawn increasingly large numbers of visitors each year. Last year, the remarkable record of 169,692 visitors for the month of May is doubtless largely attributable to these colorful displays. This May attendance, by-the-way, is equal to more than one half of the total figures for all of 1916, the year when an attendance record of this sort was first kept.

Finally, numerous visitors from the large apartment houses recently built in the immediate neighborhood of the Garden help to swell the attendance total.

We do not pretend that these causes account entirely for the remarkable increase. There are, of course, other factors, of which weather conditions are not the least important. Furthermore, we are, in this day and generation, in the midst of a great nature study movement, which is hard for us of the present to see or realize, because we ourselves are a part of it. We cannot "see the forest for the trees".

TABLE II

ATTENDANCE AT GARDEN DURING 1927

	Jan.	Feb.	Mar.	Apr.	May	June	July
At regular classes	848	1,050	2,198	1,987	2,218	2,939	9,500
At visiting classes	135	00	3,875	5,100	8,038	3,598	136
At lectures to Children	90	00	2,875	4,500	6,025	2,044	56
At lectures to Adults	00	00	50	122	802	130	0
At conservatories	1,293	783	1,408	4,676	9,128	2,414	2,738
Total registration at gates	28,212	43,579	63,185	115,336	169,692	129,480	93,298

	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Totals
At regular classes	9,000	3,484	2,729	2,171	2,021	40,145
At visiting classes	00	188	5,036	4,364	1,908	32,378
At lectures to Children	00	94	3,522	3,659	1,009	23,874
At lectures to Adults	00	00	100	133	150	1,487
At conservatories	1,669	3,399	3,296	2,511	1,248	34,563
Total registration at gates	86,821	96,787	83,583	63,168	40,152	1,013,293

Increase in the Number of Adult Students

The total number of adults registered in our courses during 1927 was 372. Of these, 244 were new. As in other years, it is gratifying to note that a large proportion of these learned of our courses through their friends who had been former students. The growth of this part of our work for the last five years is shown by the following:

Year	1923	222 Students
"	1924	349 "
"	1925	269 "
"	1926	356 "
"	1927	372 "

These figures represent the total number of *different* students only. For example, in 1927, the total registration of adults was 440, since some students elected more than one course.

New Courses

Several new adult courses were given in 1927. Dr. Gundersen's "History of Botany," a new course of three lectures, on Fridays, beginning March 4, was enthusiastically received. Dr. Gundersen's new field course, given on the grounds of the Garden, and entitled "Fall Flowers, Fruits and Seeds," also proved popular.

After a few preliminary exercises in the spring, at the suggestion of Miss Margaret S. Belyea, director of nursing, Prospect Heights Hospital and Brooklyn Maternity, and Miss Corcoran, Instructor of Nurses, a special course for nurses was given by the Curator of Public Instruction, beginning in September, and consisting of ten weekly lessons on plant life, with especial consideration of officinal plants, and with informal discussions on the care of plants and flowers in the sick room.

In the courses on the Life of Plants and General Botany, we have been handicapped for some time for lack of microscopes. The value of textbook work is slight when compared with the benefits of the visual experience derived from laboratory work with the compound microscope, where the student observes for himself, draws and makes notes on the various plant forms. We

therefore felt that we had taken a step forward when, with the addition of several new compound microscopes to our equipment, we were able to hold a laboratory period each week, devoted to the textbook assignment of the week. This laboratory period, which comes on Saturdays from 9–12, is in charge of Miss Hester M. Rusk, curatorial assistant.

Attendance at Classes and Lectures

The total attendance at classes and lectures for children and adults was 87,676. During the busy seasons, namely in April, May, and June, and again in September, October, and November, it is a common occurrence to have more than 500 children and adults a day attending our classes and lectures. Weekly schedules are prepared in advance, to avoid conflicts. Below is a fairly representative schedule during a single week of one of our busy seasons.

TABLE III

CLASS SCHEDULE

Week of October 31 to November 5, 1927

Date	School or Course	Subject	Teacher	Hour	Rm.	Number of Pupils
Monday Oct. 31	P.S. 36	Greenhouse work	Miss Hammond	2:00	330	60
	Hebrew	Greenhouse work	Miss Hammond	3:30	330	50
	C 13 Inst.	Fall Flowers & Fruits (last exercise)	Dr. Gundersen	4:00	306	30
Tuesday Nov. 1	Ethical Culture School	Demonstration		8:45	Aud.	400
	P.S. 89	Tea Reel: Talk 10–6 Motion Pictures	Miss Shaw	1:30	Aud.	200
	P.S. 6	Talk 6: Lantern. Common Trees	Miss Sargent	2:00	330	40
	A 26	Greenhouse Work	Miss Shaw	4:00	330	34
	B 2	Nature Study	Miss Hammond	4:00	327	15

TABLE III—*Continued*

Date	School or Course	Subject	Teacher	Hour	Rm.	Number of Pupils
Wednesday Nov. 2		Botany (Student Nurses)	Dr. Graves	10:00	327	12
	Friends School	Talk 5: Function of the Flowers	Miss Shaw	10:30	327	17
	P.S. 64	Talk 1: Lantern. Potted Plants	Miss Clark	10:30	330	45
	P.S. 133	Nature Collection	Miss Sargent	1:30	330	100
	Friends School	Greenhouse Work	Miss Hammond	1:15	330	15
	B 3	Principles of Agric. and Hort.	Miss Shaw	4:00	330	40
Thursday Nov. 3	Maxwell Training School	Greenhouse Work	Miss Hammond	2:00	330	28
	P.S. 2	Talk 6: Lantern. Common Trees	Miss Hammond	1:30	330	60
	G.C.H.S.	Greenhouse Work	Miss Hammond	3:00	330	15
	B 1 & C	General Botany & the Life of Plants	Dr. Graves	4:00	327	30
	C 4	Gardening in the Fall (last exercise)	Mr. Free	4:00	330	20
Friday Nov. 4	*Private Schools	Tea & Rubber: Motion Pictures	Miss Shaw	10:30	Aud.	250
	P.S. 133	Talk 4: Seed Disposal	Miss Hammond	1:30	Aud.	150
Saturday Nov. 5			Miss Shaw	9–10	330	20
			Miss Hammond	"	332	60
			Miss Clark	"	327	50
			Miss Sargent	"	320	40
	C5	Trees & Shrubs (Field)	Dr. Graves	1:21†		60
	B1 & C10	General Botany (Lab.)	Miss Rusk	9–12	322	12

* Adelphi Academy
Berkeley Institute
Birch Wathen
Friend's School
New York Ethical Culture
Woodmere Academy

† Take L. I. R. R. train from Penn. station at 1:21 p.m. Get ticket for Main Street, Flushing. At Flushing take Jamaica trolley to bridge over stream east of lake at Kissena Park.

Study Material for Schools

As in former years, we have continued to supply fresh study material to the schools to the extent of our facilities—twigs, leaves, sections of wood, flowers, protozoa, algae of various sorts, fern prothallia, fern sori, etc. This part of our work has been in charge of Miss Rusk. Including material supplied to the schools by the department of Elementary Instruction, we furnished last year 109,011 pupils with study material, and assisted in this way 21 different high schools and annexes in Brooklyn, 12 Junior High Schools, 66 elementary schools in Brooklyn, and 22 private and parochial schools of Greater New York. 2,338 petri dishes were filled with nutrient agar for the study of molds and bacteria. This part of our work has grown so far that the average demand in one month of the school year is not much less than the total annual demand six years ago—namely 358 dishes. Since the filling of these dishes is a time-consuming operation, it will be necessary, if the demand continues to increase, either to limit the amount given out, or to have additional assistance. A small greenhouse devoted entirely to the growing of materials for the schools is urgently needed.

Personal Class Work

I have carried on as usual the courses on the Life of Plants and General Botany, with weekly exercises throughout the school year. The new course given for student nurses has already been mentioned (p. 62). In the spring and fall courses on the trees and shrubs of Greater New York, given on Saturday afternoons in the various parks and woodlands of the Greater City, 36 and 63 students were registered respectively. The classes were divided into two sections, each of which received instruction, alternately, on succeeding Saturdays, from Miss Rusk and myself. In December a practical field test was given at the north end of Central Park.

As usual, in cooperation with the Brooklyn Boy Scout headquarters, I have conducted several tests for boy scouts for merit badges in Forestry and Conservation.

FIG. 8. Training Class of Nurses from Prospect Heights Hospital and Brooklyn Maternity, having a field lesson on the Castor-oil plant (shown at the left). (6416.)

Publicity

I have continued to send to the newspapers of Greater New York items about the Garden's activities and notices about the various plants in the Garden Collections, especially as they come into flower, having written 72 articles of this sort during the year. In this work Mrs. Louise Warner, of the Brooklyn Publicity Bureau, has given her able cooperation, as last year, with the result that we have received through Clipping Bureaus this year 677 items as against 513 last year. These came from 26 newspapers and periodicals in Greater New York (last year 18), and 33 from the country at large (last year 24). There is sufficient evidence to warrant the belief that these figures represent a considerable understatement of the true condition.

The papers and periodicals in Greater New York from which we have received clippings are as follows:

Boys' High (School) *Weekly*
Bronx Home News
Brooklyn Chat
Brooklyn Citizen
Brooklyn Eagle
Brooklyn Life
Brooklyn Section N. Y. American
Brooklyn Section N. Y. Evening Journal
Brooklyn Standard Union
Brooklyn Times
Brooklyn (Chamber of Commerce Magazine)
Coney Island Times
Daily News
Flushing Evening Journal
Hotel Pennsylvania Register
Literary Digest
New York American
N. Y. Evening Post
N. Y. Evening World
N. Y. Graphic
N. Y. Herald-Tribune
N. Y. Morning Telegraph
N. Y. Sun
N. Y. Telegram
N. Y. Times
Town Topics

Those from the country at large come from nine states and the District of Columbia, as follows:

New York State:
Albany Evening News Journal
Buffalo News
Farmington Post
Kingston Leader
Lockport Sun
Rochester Chronicle
White Plains Reporter

Massachusetts:
Boston American
Boston Evening Globe
Boston Morning Globe
Christian Science Monitor

Connecticut:
Danbury News

New Jersey:
New Brunswick Home News
Newark News
Newark Star
Orange Record
Rutherford
South Orange Record

Pennsylvania:
Philadelphia Inquirer
Philadelphia Public Ledger
Philadelphia Record
Pittsburgh Press

District of Columbia:
Clip Sheet, Bureau of Education
Washington News
Washington Post
Washington Star
Washington Times

Virginia:
Newport News Herald

Ohio:
Steubenville Star
Toledo Times

Texas:
San Antonio

California:
San Francisco Call

Besides this feature of the publicity work, I have prepared circulars describing spring and fall courses, which have been mailed to teachers, former students, Garden members, and members of New York Nature Clubs, as well as to others interested.

In connection with the circulars of courses issued in the fall, I arranged a calendar of educational events at the Garden.

All the courses, as well as other especial features of interest at the Garden, have been duly announced on the seven bulletin boards in the Garden. Our records show that the bulletin boards are the original source of information with a large proportion of new students.

As usual, I have prepared the *Prospectus of Courses, Lectures and Other Educational Advantages Offered to Members and to the General Public,* which appeared as the October number of the Brooklyn Botanic Garden Record.

Public Lectures

Four public lectures, with fair attendance, were given on Sunday afternoons in the spring, as follows:

May 15. Importance of the Soil for Plant Growth. Dr. B. A. Keen, Vice-Director of the Rothamsted Experimental Station, Harpenden, England.

May 22. Rock Gardens. Mr. Montague Free, Horticulturist, Brooklyn Botanic Garden.

May 29. Irises and Their Cultivation. Dr. G. M. Reed, Curator of Plant Pathology, Brooklyn Botanic Garden.

June 5. Ornamental Trees and Shrubs for the Home Grounds. Dr. Arthur Harmount Graves, Curator of Public Instruction, Brooklyn Botanic Garden.

Spring Flower Days

In order to give our members an opportunity of seeing the various flower displays on the grounds to the best advantage, a series of Flower Days was arranged as follows:

1. *Crocus Day,* April 6. Guide: Dr. Arthur Harmount Graves.
2. *Daffodil Day,* April 26. Guide: Dr. Alfred Gundersen.
3. *Tulip Day,* May 17. Guide: Dr. Orland E. White.

4. *Rock Garden* and *Alpine Day*, May 24. Guide: Mr. Montague Free.
5. *Iris Day*, June 7. Guide: Dr. George M. Reed.

At each of these "Days" a preliminary talk of 10 to 15 minutes' length was given in the Laboratory Building, and this was followed by inspection of the flowers on the grounds. Various questions relating to the culture and selection of suitable varieties of the plants in question were discussed informally.

A preliminary announcement of the plan was sent in March to each member of the Garden, with a tentative schedule of dates for the various flower displays. Since such dates must depend on the progress of the season, postcard announcements were sent out a few days before each occasion, definitely fixing the date.

Bureau of Information

Requests from visitors, and by letter and telephone, for information of every conceivable sort relating to plants, are continually increasing; and since a large portion of my time is occupied with answering these questions, I feel that mention of the fact should be made in this place. Much of the information could not be given without the coöperation of the Staff, in particular of the Librarian, the Curator of Plants, and the Horticulturist.

Editorial Work, etc.

I have continued to serve as Editor for the following periodicals:

1. Plant section of General Biology in *Biological Abstracts.*
2. *American Journal of Botany.*
3. *Brooklyn Botanic Garden Leaflets.*

I have also served, for the fourth consecutive year, as secretary of the Torrey Botanical Club.

In a separate report (p.) I have given an account of the research work I have been able to carry on during the year. On account of the increasing demands of other duties on my time, there has been little opportunity for independent work of this sort.

Respectfully submitted,

ARTHUR HARMOUNT GRAVES,
Curator of Public Instruction.

FIG. 9. Hedges of ornamental Grasses in winter. Left side of walk (from left to right), *Miscanthus saccharifer* (tall plumed), *M. sinensis gracillimus, Festuca ovina glauca.* Right side of walk (from left to right), *F. ovina glauca,* alternate plants of *M. sinensis zebrina* and *M. sinensis variegata,* and *M. saccharifer,* November 29. (6023.)

REPORT OF THE CURATOR OF ELEMENTARY INSTRUCTION FOR 1927

DR. C. STUART GAGER, DIRECTOR.

Sir: I hereby present the fifteenth annual report from the Department of Elementary Instruction.

Garden Classes

The registration in our regular classes has increased from 3,792 in 1926 to 4,405 for 1927, with an attendance of 38,196 this year against 23,909 of last year. These classes include adult classes in greenhouse work, nature study, and garden practice; children's classes, held on Saturday mornings during the school year and every week day during the summer vacation time; visiting classes; and classes for periods of five weeks' duration. Some of our local public and private schools for a number of years have requested such short courses during school hours. These requests have been increased this year, encroaching somewhat upon time given to the visiting classes; but the educational value of the short course against the single visiting-class-period, would seem far greater. A group of seventh year students from the Brooklyn Ethical Culture School has come once a week for the entire year. This class is doing intensive work in nature study. Two classes of senior students from the Maxwell Training School for Teachers, in nature study, an elective course, have been with us once a week for the school term.

A request, similar to the one made last year by Public School 48, Brooklyn, was entered by Public School 36, Brooklyn (Mr. Mark Barth, Principal and Miss Johanna Becker, Head of Department) that we help with the following educational problem: 300 children and their teachers of the fifth year, representing seven classes, assembled for one period of fifty minutes in the school auditorium to receive instruction in nature study. The Curator went every other week (eight times, in all), alternating with the school Head of Department. The plan of work was based on the city syllabus for nature study. The enthusiasm of the children made work easy and results possible.

Our regular Saturday morning class work has increased. During the month of January a group of older boys and girls, for the most part high school students, returned to the Garden for the entire Saturday mornings, working on flower games under the direction of Miss Kathryn P. Clark, instructor. These games, new or re-worked to suit our conditions, were played during the spring and summer by all the children in the Garden. The work resulted in a little booklet "Flower Games," copyrighted and published by the Brooklyn Botanic Garden at Christmas time, and partly financed by our boys and girls.

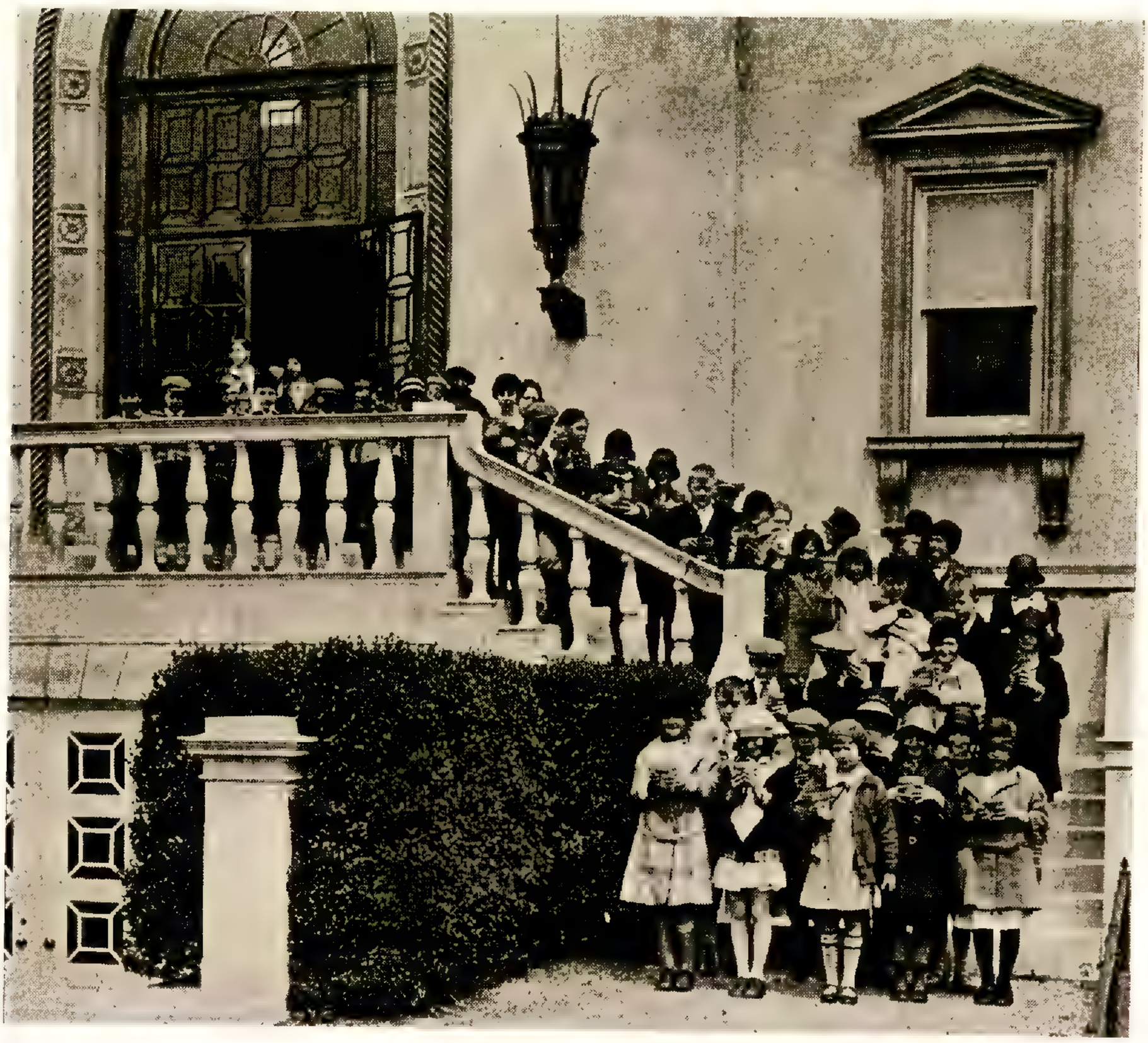

FIG. 10. Class from Public School 41 taking their share of the 25,000 potted plants placed in the classrooms of Brooklyn schools by the Botanic Garden during 1927. (6197.)

Seed Work

This year about 125,000 more penny packets of seeds were sold than in the year 1926. Two hundred and twenty-five schools were supplied with seed. The School Garden Association of New York approached us this fall with the request that we circularize all the schools of all five boroughs of this city for the sale of penny packets of seed. We are planning to do so in 1928. Because of this decision, work has been doubled in preparation for the 1928 sale of seeds, so a heavy strain has been made upon the time and energy of our Department and also its budget. Great credit is due to Miss Ethel Woodward, instructor, for her efficient management of the work. If this work of circularizing the boroughs proves successful, a seed filling machine will become a necessity.

Nature and Plant Material Supplied to Schools

One hundred and fifty-three schools have called upon this department alone, for nature-study material. Over 25,000 plants have been distributed to schools this year for the beautifying of classrooms. Through these two avenues we served over 3,000 teachers, whose classes comprised over 100,000 pupils.

Outside Activities

The first week in October the Department set up an exhibit at the Hotel Astor as part of the Exposition of Women's Arts and Industries. Our exhibit was sponsored by the Woman's Auxiliary of the Brooklyn Botanic Garden. The Auxiliary planned a house plant contest with prizes to be awarded at an exhibit to be held in March, 1928. This became a center of interest at our booth, Names of those desiring to enter such a contest were taken. Each afternoon the curator or assistant curator gave one or more talks on house plants and their care. Over one hundred names of those interested in the contest were enrolled at this time. The contestants were invited to the Botanic Garden on October 27th for further discussion of the contest and another talk on plants. The response was most gratifying. A special feature on exhibit at the booth was a model of our children's garden, worked on during the summer, and completed for the Astor exhibit.

An exhibit of our children's fall Saturday morning class-work was set up as a part of the Annual Christmas Exhibit of the Woman's Auxiliary, held December 13th to 18th. Each afternoon some phase of the work was demonstrated by the children either in actual work, as the making of bayberry candles, or in the presentation of short talks illustrated by lantern slides, such as "A Botanic Trip Around the World."

The number of requests made upon the Department for addresses in schools and clubs increased from a total of 23 in 1926 to 79 in 1927, with a total attendance of 32,189 at these talks.

Many demands have come to us from the outside for assistance and for literature concerning our educational plans, by individuals and institutions, some of which are the following:

Department of Public Instruction, Columbus School
Elmira (N. Y.) Community Service
National Council of Nature Study and Gardening
National Plant, Flower and Fruit Guild, Brooklyn Branch
Nature Club in Schools in Queensboro, North Carolina
New York Ethical Culture School
New York University Educational School
People's University Extension
R. H. Macy and Company (N. Y. City)
Sam Houston State Teacher's College, Huntsville, Texas
Spring Hill School, Litchfield, Conn.
Wild Flower Preservation Society

Special Departmental Features

During the summer the assistant curator, Miss Elsie T. Hammond, visited 150 home gardens of children from public and private schools in Beacon, New York.

The curator wrote a series of 25 articles extending throughout the year, for the New York *Sun*. The articles were for amateur gardeners.

The Department has published this year a book of games, referred to above, and has prepared a new *Syllabus* on sugar.

The first of October Miss Zelda Sargent, former Assistant Supervisor of Nature Study in Springfield, Mass., was added to the staff of this Department.

FIG. 11. Part of a class studying Economic Plants in the conservatories. (6405.)

The Alfred T. White Scholarship this year was presented to Robertson Pratt, formerly of Erasmus Hall High School and now of Columbia University.

Personal Activities

I continue to act as National Secretary of the National Plant, Flower and Fruit Guild.

Respectfully submitted,

ELLEN EDDY SHAW,
Curator of Elementary Instruction.

REPORT OF THE CURATOR OF PLANTS FOR 1927

DR. C. STUART GAGER, DIRECTOR.

Sir: I beg to submit herewith my report for the year 1927.

European Trip

I returned February 1, 1927, after an absence of five months in Europe. After thirteen years in the Brooklyn Botanic Garden, I had a desire to see European botanic gardens and to learn directly of their lines of activity. I visited twenty botanical institutions in Scandinavia, Germany, Switzerland, France, and England. I wanted especially to know of the possibility of more satisfactory cooperation in connection with the exchange of seeds and plants. The question of international plant lists for the development of botanic gardens had been taken up by correspondence in our "International Seed Exchange Communications." While the advantages of greater international uniformity are recognized, various practical difficulties exist in the way of changes toward uniformity. Learning of the many different points of view was most instructive. All botanists hope for progress in this direction as one of the results of the 1930 International Botanical Congress to be held in England. I was impressed by the apparent readiness of smaller institutions to follow the lead of larger ones.

I left New York on SS Bergensfjord, August 28, 1926, for Bergen, Norway. I crossed on the scenic mountain railway from Bergen to Oslo and remained two weeks on the mountain Try-

silfjeld near the Swedish border. At its summit, elevation about 4,000 ft., lat. 61°, well above the timber line, were mostly loose rocks. There were just five species of vascular plants, namely *Lycopodium Selago, Empetrum nigrum, Phyllodoce coerulea, Luzula pilosa,* and *Agrostis borealis.* The rocks were greenish with the lichen *Rhizocarpon geographicum;* a little lower were many other plants. Some weeks later I was much interested in seeing many of these plants growing and labeled in the Scandinavian Mountains area of the Berlin Botanic Garden.

From the point of view of situation I was especially impressed by the botanic gardens of Geneva, Switzerland, and Gothenburg, Sweden, the former not far from the seat of the League of Nations, with a magnificent view of Mt. Blanc and the Alps, the latter in a picturesque situation among the hills outside the city. In the Gothenburg garden everything was new, making it seem more like our Brooklyn Garden.

As to collections, the various gardens had different points of distinction. Everywhere in Europe evergreens gave the appearance of growing much more readily than in Brooklyn. The French National Arboretum at Nogent sur Vernissons had one of the finest collections, with small forests of single species. At the forestry school of Charlottenlund, near Copenhagen, was a fine collection of evergreens. Even on the coast of Norway I saw *Sequoia gigantea* and *Araucaria imbricata,* not hardy in Brooklyn. The moist and more even European climate evidently is more favorable to evergreens.

The geographical divisions of the Berlin Garden with many artificial mountains were very instructive. From an American viewpoint it seemed as though the European divisions were rather numerous. The cactus collection there was very fine, as was that of Munich. In general arrangement the conservatories of Munich appeared to be second to none. There were also extensive collections of water plants. They seem to have more expert gardeners in Europe.

I visited the Kew Gardens near Christmas, yet it was mild to walk outdoors. The trees there have the dignity of age and at the same time abundant space. There was a wonderful wealth of tropical plants.

I was much interested in visiting the various herbaria. In those of Copenhagen, Berlin, Geneva, Paris, Kew, and others I gave some time to the study of Frankeniaceae. In this connection I had occasion also to visit the various libraries.

After seeing so many botanic gardens, several larger, many more than a hundred years old, I realized that we have many things to learn. I returned to the Brooklyn Botanic Garden satisfied that in the comparatively short time of fifteen years a good beginning has been made here.

Collections

Among plants of special interest added to the collections of living plants last year may be mentioned, *Amorphophallus Rivieri, Helwingia japonica,* and *Glyptostrobus pensilis.*

An inventory of the Rock Garden was taken in May and June, after an interval of nine years. The number of genera represented was 211, species 640. These species were later entered on an interleaved copy of the Kew Rock Garden Handlist.

Later the collections of trees and shrubs were studied and in part remapped, preparatory of the collecting of seeds.

Dr. George M. Reed reports on the Iris garden as follows:

Bearded Iris

Sixty-three varieties of tall bearded Iris were added to the collection in 1927. There were secured from the following:

Mrs. C. S. McKinney, Madison, N. J.	4	varieties
Mrs. E. A. S. Peckham, New Rochelle, N. Y.	2	"
Miss Theodora Van Name, New Haven, Conn.	1	"
Dr. John W. Scott, Lexington, Ky.	10	"
American Iris Society Test Garden	46	"

These have been received either in exchange or as gifts. We have also increased the number of varieties belonging to the interesting group of Pogo-cyclus. These are hybrids between the Oncocyclus Irises and various varieties of the tall bearded type. Most of them were originally developed by Sir Michael Foster.

FIG. 12. Class from a private school studying Daffodils in the lawn, April 24. "He is happiest who hath power to gather wisdom from a flower." (P. & A. Photo.)

Phanerogamic Herbarium

Among the collections acquired last year were 500 specimens, mostly from the Northeastern United States from Mrs. L. Holtzoff; about 300 specimens of European plants from Mr. Winfred Roelker; 31 specimens of the New Hebrides, Polynesia, from the Whitney South Sea Expedition, 50 specimens of ferns from the Smithsonian Institution, and 57 specimens of Australian plants from the National Herbarium, Melbourne.

During the summer, with the assistance of Miss Dodd, 10 sets of about 100 specimens each were collected from the Northeastern Catskills; these will be ready for exchange purposes early in 1928.

The collections in the herbarium workroom are greatly in need of attention.

International Seed Exchange Communication

With *Communication No. 8* was sent a brief questionnaire as to the desirability of an *International List of Genera,* its duration, if established, and suggestions as to the names of ten institutions to advise as to a possible preliminary list. The replies will be published early in 1928.

Labels and Signs

Labels and signs were made by Mr. John McCallum as follows:

Steel labels for the herbaceous beds	51
Family labels for the beds	12
Lead labels for woody plants	130
Lead labels for conservatory plants	42
Lead labels for rock garden	40
Small wood labels	159
Large wood labels for horticultural forms	34
Wooden signs	35
Cardboard signs	207
Total	710

Also numerous miscellaneous numbers and signs.

Lectures and Class Work

During March I gave three lectures on "The History of Botany." During May and June I conducted two outdoor courses on "Spring Flowers and Ferns," in all sixteen periods.

Personal Activities

I continued a third year as chairman of the field committee of the Torrey Botanical Club, arranging 35 meetings. This work will now be continued by Mr. Raymond Torrey.

I gave some time to the preparation of abstracts for *Biological Abstracts.*

Statistics

Living Plants received during 1927

	Plants	Species
By exchange	286	249
By gift	97	74
By purchase	998	289
Derived from seed	214	214
Total	1,595	826

Living Plants distributed:

By exchange	187
To members	1,133
Total	1,320

Seed packets received:

By exchange	694
By purchase	76
By gift	27
Total	797

Seed packets distributed:

By exchange	2,408

Herbarium specimens received:

By exchange	228
By collection	7
By gift	941
By purchase	25
Total	1,201

Respectfully submitted,

ALFRED GUNDERSEN,
Curator of Plants.

REPORT OF CURATOR OF PLANTS FOR 1927

DR. C. STUART GAGER, DIRECTOR.

Sir: I submit herewith my annual report for the year 1927.

Research work was continued on the flora and vegetation of Long Island, as outlined in the record of research activities elsewhere.

With your permission, and with a leave of absence from the Garden, I took charge of the courses in Botany at the new Allegany School of Natural History, Allegany State Park, N. Y., during July and August. Lectures and field trips were combined in a study of the Beech-Birch-Maple forests, and other vegetation types. In addition to this class work, I wrote a report entitled *Vegetation of Allegany State Park* which will be published as a Handbook of the New York State Museum, for distribution to the public next summer. This will also appear as Brooklyn Botanic Garden *Contribution No. 54.*

The Agricultural Experiment Station at Cornell University issued as Bulletin 458, my paper on the *Climate of Long Island.* This is part of the *Forests of Long Island* and, with the sections on soils, succession, forest types, etc., will comprise Part two of Volume two of the Botanic Garden *Memoirs,* the first part of which is *the Vegetation of Montauk.* It was reprinted as Brooklyn Botanic Garden *Contribution No. 50.*

In cooperation with Dr. Reed and Mr. Free, I have made pH determinations and moisture-holding-capacity tests for the soils on 18 beds in the Iris Test Garden, each of which is being treated differently as to fertilizers, etc. The plan involves making later tests from the same beds to determine the effects of the diverse treatment upon the soils, and, of course upon the iris plants.

In June the long delayed publication of Volume three of the *Memoirs* of the Garden was accomplished. This completes a study begun in 1921 with Major Barrington Moore. The paper is entitled *Vegetation of Mount Desert Island, Maine, and its Environment,* and comprises 151 pages, 14 tables, 27 text figures, and a colored vegetation map.

In December I visited the herbaria of Cornell University, the

State Museum at Albany, and the Gray Herbarium at Harvard University in connection with the work on the *Flora of Long Island*.

During the autumn I arranged for and moved to the Garden the botanical material from the Long Island Historical Society. The Society has deposited this with the Garden with the hope that we can make more use of it than they could. Among other things it contains a complete collection of cross sections of Long Island woods, made many years ago by E. S. Miller, of Wading River, and the late Elias Hicks.

Answering inquiries, particularly as to garden and Long Island soils, and the identification of specimens of Long Island plants has taken considerable time. Many of the soil samples have come from Brooklyn schools through the department of elementary instruction.

Personal Activities

I have continued to serve as an Associate Editor of *Ecology*, and upon the executive committee of the directors of the Long Island Historical Society. During the year I was appointed as chairman of Nature Guidance of the New York section of the Green Mountain Club. During the year I completed the manuscript of a *Guide to the Wild Flowers*, a popular book on the identification of the common plants east of the Mississippi and north of Virginia. It will be published early in 1928.

Respectfully submitted,

NORMAN TAYLOR,
Curator of Plants.

REPORT OF THE HORTICULTURIST AND HEAD GARDENER FOR 1927

DR. C. STUART GAGER, DIRECTOR.

Sir: I beg to submit herewith my report for the year ending December 31, 1927.

Beginning January 1, 1927, the laboring force came under my charge, making my position virtually Superintendent of Grounds, in addition to that of Horticulturist and Head Gardener:

Personnel

Gardening Force.—Two foreman gardeners and five gardeners come under this head. The time of one man is assigned to the Experimental Plot, one man acts as guard and gardener in the Japanese Garden, and half the time of one man is taken by the Department of Elementary Instruction, leaving two foreman gardeners, two men and one half the time of one man for gardening work in conservatories and grounds. One man from the laboring force is permanently assigned to the gardeners, and, during the active growing season one or two additional men, as occasion warrants.

Mr. Konstanty Marshlewski, foreman gardener (outdoors) resigned his position May 14, 1927. Mr. Marshlewski was appointed as a gardener March 25, 1915, and with the exception of a period of about ten months in 1917–18 continued with us until the day of his resignation. During this long period he gave efficient, interested, and faithful attention to his duties, and I am sorry to lose his valuable services. Mr. Clement G. Agate was appointed to fill this position May 16th.

Laboring Force.—This varies in strength according to seasonal demands. The foreman and three men are kept throughout the year. In 1927 the average number of laborers per diem from March 18 to December 31 was ten.

General Systematic Section

Work in this section consisted mainly of maintenance, although a considerable number of species and varieties of both woody and herbaceous plants were added to the collections.

Ornamental Planting

In the spring a collection of flowering trees, mostly varieties of *Prunus cerasus* (cherries) and *Malus* (apples), were planted in the area between Cherry Walk and the Esplanade. Over seventy trees were set out representing sixty species and varieties. The preparation of the soil for the reception of these trees involved a considerable amount of labor as the holes were dug two feet deep and six feet in diameter. As usual, glacial boulders were en-

countered, ranging from 200 to 800 lbs. or even more in weight. These boulders had to be broken and removed before the trees could be set out, greatly adding to the cost of planting.

Thirteen new beds for the reception of bearded iris were made and planted on the east side of Cherry Walk, and forty dwarf junipers were planted on the bank west of the outlet to the lake.

The Narcissus bed in the Systematic Section was replanted and the surplus material was used to extend the "naturalized" plantings of Narcissus on the bank opposite the Laboratory Building. The two tulip beds were made over and replanted with additional species and varieties, the surplus being used in a planting on either side of the road between the walnuts and the oaks.

Rose Garden

The first sod was turned in the construction of the Rose Garden on June 14, without any ceremony. Previous to this a contour map of the area had been made by Mr. Thatcher T. P. Luquer. The result of this survey was carefully studied by Mr. Harold A. Caparn, our consulting landscape architect, and myself, with a view to obtaining a satisfactory new grade with a minimum of change, and the avoidance of the necessity of buying much top soil .

The garden is 500 feet long. North of the pavilion it forms a rectangle 353 feet long and 93 feet wide. South of the pavilion the area is roughly in the shape of a right-angled triangle with a convex hypotenuse. The whole garden occupies about one acre.

In order to secure a satisfactory grade it was necessary to cut, on the average, one foot on the west side of the rectangular area for a distance of 350 feet and fill one foot for a similar distance on the east side, thus making the garden level in its width. For the longitudinal dimension of the garden, Mr. Caparn devised a grade in the form of a reverse curve which is very satisfactory in appearance and which involved a minimum of re-grading. The perfect drainage that is necessary for the healthy growth of roses is provided by the sandy, rocky sub-soil and by a sloping sub-grade. The whole planting area has been worked over, and has been provided with top soil to a depth of eighteen inches. This was accomplished by using the top-soil from the walk that extends all

FIG. 13. Privet hedge enclosing the Children's Garden on the north and west. View facing south. (5987.)

around the garden. The walk was then filled in with sub-soil. Subsoil was also used to form the base of the mound on which the pavilion is constructed, and which provides a vantage point from which to view the garden as a whole. The work of grading was considerably hampered, as usual, by the many glacial boulders encountered and also by two old roads, the existence of which we did not suspect. These crossed the garden diagonally about ten inches below the surface and had to be removed. It was necessary to buy about forty cubic yards of top soil to finish the grade around the pavilion and south of it. One hundred and fifty cubic yards of cow manure was mixed with the top soil.

The digging of trenches for irrigation pipes and for foundations, the making and pouring of concrete, and in some cases the making of rough forms, was done by our own men. The concrete posts for the fence surrounding the garden (eighty-one in all, each 11 ft. by 6 in.), twenty-eight square concrete pillars for the support of the pavilion and pergolas, and the fence panels surrounding the garden were also made and erected by our own men at a considerable saving. Eighty-three cubic yards of aggregate (stone and sand), and 444 bags of cement were used.

The above work was carried out by a force of laborers extraneous to the general force.

About one thousand rose bushes were planted in the fall.

Work still remaining to be done to complete the rose garden is as follows:

Paving floor of Pavilion and approaches.
Making four sets of concrete steps.
Erection of ten double arches over walks.
Surfacing walks.
Setting iron verge between walks and grass.
Making two beds in south triangle and finishing terrace.
Planting about two thousand roses, vines, rhododendrons, and other plants.
Making and erecting 30 concrete posts for festoons.
Gates are needed for three of the entrances, and the appearance of the north pergola would be enhanced if lattice frames were provided on its north side to correspond with those on the south.

North Addition

About four acres of this area (between Mt. Prospect Reservoir and the Brooklyn Museum site) have not yet been permanently planted. The soil is abominable, and during 1927, as in previous years, efforts were made to improve it. Two crops of buckwheat were ploughed in. A dressing of manure was applied in the fall, and rye and hairy vetch were planted to provide a green-manure crop to be ploughed under in the spring of 1928. This land needs much more manure, and, on the lower one third, a layer of good top soil about six inches thick.

Rock Garden

Single-rail fences of cedar poles, about 15 inches high, were placed along each side of the main walk through the Rock Garden and the most used trail. These help to protect the plants from the careless feet of visitors without detracting materially from the appearance of the garden.

International Seed Exchange

The distribution of seeds (of herbaceous plants only) in the spring of 1927 to various countries is shown below:

TABLE I

Country	No. of Institutions	No. of Packets	Country	No. of Institutions	No. of Packets
Austria	4	98	Italy	9	182
Bulgaria	1	37	Japan	1	4
Canada	1	31	Jugoslavia	1	38
China	1	9	Lithuania	1	60
Czechoslovakia	3	104	Norway	1	61
Denmark	1	21	Poland	2	103
England	5	78	Roumania	2	92
France	11	324	Russia	4	100
Germany	13	290	South America	3	69
Holland	4	85	Spain	1	54
Hungary	1	20	Sweden	4	104
India	1	46	Switzerland	3	71
Ireland	2	26	United States	8	301

Totals—26 countries, 88 institutions, 2,408 packets.

Recommendations

As indicated in the report of the Curator of Plants and Plantations for 1924, permanent structures are urgently needed to replace in several places, the present flimsy, dangerous, wooden steps and bridges.

In connection with the maintenance of the Rose Garden and new areas that have been brought under cultivation, the services of three more men are a necessity if the garden is to be kept in a satisfactory state of upkeep.

Educational Work

This has been substantially the same as in previous years. I conducted two courses for the general public at the Botanic Garden; namely, The Flower Garden, and Gardening in the Fall. A number of lectures were given outside the Botanic Garden and I have answered many requests for information on garden problems and plant culture, both orally and by letter.

Personal Activities

In January I made a trip to a number of the Islands of the Lesser Antilles, and Trinidad. The Botanic Gardens at Castries, St. Lucia; Roseau, Dominica; St. George, Grenada; and Port of Spain, Trinidad; were visited and valuable contacts made.

I spent two days at the Arnold Arboretum in June and obtained cuttings of many woody plants for the Garden collections.

In the fall I visited Washington, D. C., and saw something of the activities of the Federal Horticultural Board, and visited the Arlington Experiment Farm.

Respectfully submitted,

MONTAGUE FREE,

Horticulturist and Head Gardener.

REPORT OF THE LIBRARIAN FOR 1927

DR. C. STUART GAGER, DIRECTOR.

Sir: I take pleasure in submitting herewith my report for the year ending December 31, 1927.

There have been decided increases in various phases of the work of the department. About 600 volumes were forwarded for binding as contrasted with a little over 200 of last year; 870 current periodical and serial titles were received by gift, exchange, purchase, or deposit. The total accessions numbered 7,865, of which 622 were books, 607 pamphlets and the remainder parts of serials and periodicals.

Reference Work

It may be well at this point to call attention to the diverse types of reference questions the department is called upon to answer for individuals, firms, and institutions. A firm of investment bankers, or one of patent attorneys, both of the metropolitan district of New York, would hardly be considered firms that would seek the aid of a botanic garden library. It would seem more natural for a patent medicine firm to telephone us (as was done) for information as to where may be found an illustration of a longitudinal section of a grain of wheat; or for an editorial writer to call personally to consult Parkinson's *Paradise in Sole,* a book printed in London in 1629. Here is an institution of a neighboring state asking where tree labels may be purchased; a visitor spends a day in the library to find out what herbs can be grown commercially on ten acres of woodland in Connecticut; another institution desires a list of references on the Mexican bean beetle; one of the Fathers of a church nearby pores over illustrations of flowers for inspiration in designing new stained glass windows. A visitor wishes to rid his thirty-acre lake of pond lillies, without poisoning the water or the fish, as the lake is used for commercial purposes, and still another is especially interested in hybrid poplars for the cultivation of wood in the manufacture of matches.

We could go on indefinitely writing of information given to members of garden clubs, to journalists, to physicians, to members of museum staffs, to artists, to an electrical laboratory in a

neighboring state; but we believe that the instances mentioned will suffice to give a better and clearer idea of the reference work the library is doing in its own community and outside of it.

Accessions

Among the 622 volumes received during the year are a number of important monographs, and other interesting works. Among these may be mentioned: *Handbook of Crocus and Colchicum,* by E. A. Bowles; Bresadola's *Iconographia Mycologica;* Cheeseman's *Illustrations of the New Zealand Flora; The Genus Iris* by W. R. Dykes; *Gardner's Orcharding; Genetic Studies of Genius; Kostychev's Plant Respiration; The Magnolias,* by J. G. Millais; Nowak's *Documenta Microbiologica, Pt. 1;* Pepoon's *Annotated Flora of the Chicago Area;* Rehder's *Manual of Cultivated Trees and Shrubs;* Shaw and Owens's *Smoke Problems of Great Cities; The American Oaks,* by William Trelease.

Walcott's *North American Wild Flowers* was presented to the library by Miss Harriet H. White; and John Fisk Allen's *Victoria Regia,* illustrated by William Sharp, was donated by the Long Island Historical Society.

Among the titles added to the Pre-Linnean Collection is one belonging to the incunabula, and six titles from sixteenth century presses. These are the *Opus Ruralium Commodorum,* by Petrus de Crescentius, 1495; Dioscorides' *De Medicinali Materia Libri Sex, Joanne Ruellis Interprete,* Lyons, 1550; Hieronymus Bock's *Kreuter buch,* darinn Underscheidt, Strassburg, 1551; the *De Historia Stirpium Commentarii Insignes,* by L. Fuchs, Lugduni, 1551; Conrad Gesner's *Thesaurus Euonymi Philiatri, de Remediis secretis,* Lugduni, 1554; Cristoval Acosta's *Tractado delas Drogas y Medicinas de las Indias Orientales,* Burgos, 1578; and *Trattato di Christoforo Acosta Africano Medico . . .* 1585, being the first Italian translation, printed in Venetia.

Thirty-seven volumes were added to the Boys' and Girls' Club Room Collection, bringing the total to 199 volumes.

There are approximately 2,364 volumes in the Overflow Collection shelved in the lower stack room. 862 volumes were transferred from the main collection to the Overflow during the year.

Periodicals and Serials

Some of the new titles added to this file are: *Angewandte Botanik; Archives de Botanique; Archiv für Experimentelle Zellforschung;* the *Arbeiten, Beilage, Bibliographie der Pflanzenschutz-literatur, Flugblatt, Mitteilungen,* and the *Nachrichtenblatt* from the Biologische Reichsanstalt für Land und Forstwirtschaft, Berlin-Dahlem; *Flore Complète Illustrée; Fortschritte der Landwirtschaft,* Vienna; *Botanisch Jaarboek* from the Kruidkundig Genootschap Dodonaea, Gent; *The Library,* Newark, N. J.; *Yearbook of the Milwaukee Public Museum; Den Nordiske Race; Protoplasma; Review of Agricultural Operations in India; Revue Scientifique Illustrée* (*Revue Rose*); the *Boletin Mensual* and the *Estudios* from the Secretaria de Agricultura y Fomento, Mexico; *Silva Fennica;* the *Boletin* and *Memoria* of the Sociedad Nacional de Agricultura, Chile; *Contributions* from Stanford University, Dudley Herbarium; *Journal of the Faculty of Science, Sect. 3, Botany,* Tokyo Imperial University; *Travaux de l'institut Nencki,* and the *Travaux et Publications de l'école superiore d'Agriculture,* both of Warsaw, Poland.

Future Exchanges

The librarian corresponded with foreign departments of agriculture, botanical and agricultural institutes and laboratories, scientific societies, agricultural experiment stations. Sample copies of their publications were requested to enable us to decide on future exchanges. These letters were sent to various institutions in East Africa, Algeria, Australia, Austria, Belgium, Bulgaria, Denmark, England, Federated Malay States, Formosa, France, Germany, Hungary, Italy, Java, Seychelles Islands, and Switzerland.

Binding

About six hundred volumes were forwarded to the binder. For the first time agricultural experiment station publications are being bound, and approximately 5,000 annual reports, bulletins, etc. are being bound into volumes. A larger number of titles from the book collection are being bound than has been the case in the past. We have been able to accomplish this unusual amount of bindery work due to extra temporary assistance, made possible by a special contribution for this purpose.

Inter-Library Loans

Forty-eight titles were borrowed for staff use from the American Museum of Natural History, Brooklyn Museum, Brooklyn Public Library, Columbia University, Cornell University Medical College, Medical Society of the County of Kings, Teachers College, and the Library of the U. S. Department of Agriculture.

Twenty-six volumes were loaned to Brooklyn Museum Library, Carnegie Institution of Washington, Carnegie Station for Experimental Evolution, Cold Spring Harbor, L. I., Columbia University, Cornell University Medical College, National Bank of Commerce of New York, Pennie, Davis, Marvin and Edmonds, New York, Pennsylvania State College, Princeton University, and Rockefeller Institute for Medical Research.

Changes in Staff

On September first Mrs. Emilie Perpall Chichester, was appointed library assistant, in place of Miss Edith R. Daly, resigned.

On December 7th, Mrs. Gladys Glenn Zunser, was made temporary assistant in connection with bindery work.

Miss Ruth Blankley, who had assisted in the library every morning (except Saturday), was transferred to the department of elementary instruction, as stenographer.

Miscellaneous

The Library was represented, as usual, at the New York Library Club, Eastern College Librarians' Meeting, the Special Library Association, and the New York Regional Catalogue Group.

Groups from the Maxwell Training School, and students from the same school, who were in the Museum Training Course at the American Museum of Natural History, visited the library and were given an idea of the work and scope of the department.

Exhibits of books, periodicals, and other material germane to the subjects, were arranged for " Spring Day " Walks, the annual Spring Inspection, and for the meeting of the Contemporary Club.

For List of donors and gifts see Appendix 1.

The statistical report follows:

FIG. 14. A busy morning in the Library. Class from New York School of Fine and Applied Art. (5844.)

STATISTICAL REPORT ON THE LIBRARY

Accessions

	Volumes	Pamphlets	Parts (Including Periodicals)
Exchange	92	209	3,650
Gift	90	222	1,694
Publication	13	173	423
Purchase	306	3	864
Bindery	121	0	0
Deposit	0	0	5
Total	622	607	6,636

Total number of volumes in library, December 31, 1926	11,052
Number of volumes added during 1927	622
Total number of volumes in library, December 31, 1927	11,674
Total number of pamphlets in library, December 31, 1926	8,295
Number of pamphlets added during 1927	607
Total number of pamphlets in library, December 31, 1927	8,902
Total number of volumes and pamphlets in library, December 31, 1926	19,347
Number of volumes and pamphlets added during 1927	1,229
Total number of volumes and pamphlets in library, December 31, 1927	20,576

Serials, Periodicals, and Documents

Subscription	93
Gift	79
Exchange	685
Deposit from Brooklyn Public Library	2
Publication	11
Total	870

Cataloguing

Books, Pamphlets, and Serials catalogued	3,255
Total catalogue cards typewritten and filed	3,099
Torrey Botanical Club index cards on file, December 31, 1926	35,580
Filed during 1927	1,848
Total, December 31, 1927	37,428
Index Algarum Universalis cards, December 31, 1926	22,519
Received during 1927	1,900
Total, December 31, 1927	24,419

Miscellaneous

Attendance in library	7,370
Books loaned to members of staff	1,319
Books loaned to other institutions	26
Books borrowed from other institutions	48

Respectfully submitted,

RAY SIMPSON,
Librarian.

FINANCIAL STATEMENT FOR 1927

I. Tax Budget Accounts

1360 *Personal Service:*

Appropriation	$ 72,253.00
Expended	72,253.00

1361 *Other Codes than Personal Service:*

Line 1 Fuel Supplies:

Appropriation		$ 4,500.00
Expended	$ 4,053.13	
Transferred to Code 1361, Line 8, General Plant Equipment	165.76	
Transferred to Code 1361, Line 10, Repairs and Replacements	131.11	
Transferred to Code 1361, Line 13, Hire of Horses and Vehicles with Drivers	150.00	4,500.00

Line 2 Office Supplies:

Appropriation	$ 400.00
Expended	400.00

Line 3 Laundry, Cleaning and Disinfecting Supplies:

Appropriation	$ 80.00
Expended	80.00

Line 4 Botanical and Agricultural Supplies:

Appropriation	$ 1,200.00
Expended	1,200.00

Line 5	General Plant Supplies:			
	Appropriation			$ 275.00
	Expended			275.00
Line 6	Wearing Apparel:			
	Appropriation			$ 40.00
	Expended			40.00
Line 7	Office Equipment:			
	Appropriation			$ 200.00
	Expended		$ 150.00	
	Transferred to Code 1361, Line 8, General Plant Equipment		50.00	200.00
Line 8	General Plant Equipment:			
	Appropriation		$ 1,200.00	
	Transferred from Code 1361, Line 1, Fuel Supplies		165.76	
	Transferred from Code 1361, Line 7, Office Equipment		50.00	$ 1,415.76
	Expended			1,415.76
Line 9	General Plant Materials:			
	Appropriation			$ 1,650.00
	Expended			1,650.00
Line 10	Repairs and Replacements:			
	Appropriation		$ 4,000.00	
	Transferred from Code 1361, Line 1, Fuel Supplies		131.11	
	Transferred from Code 1361, Line 11, Light, Heat and Power		66.71	
	Supplemental Appropriation (From Miscellaneous, New York County, 3225 N. Y. County Fund for Salary and Wage Accruals)		1,530.00	$ 5,727.82
	Expended			5,727.82
Line 11	Light, Heat and Power:			
	Appropriation			$ 400.00
	Expended		$ 333.29	
	Transferred to Code 1361, Line 10, Repairs and Replacements		66.71	400.00

Line 12	General Plant Service:			
	Appropriation			$ 500.00
	Expended			500.00
Line 13	Hire of Horses and Vehicles with Drivers:			
	Appropriation		$ 500.00	
	Transferred from Code 1361, Line 1, Fuel Supplies		150.00	$ 650.00
	Expended			650.00
Line 14	Telephone Service:			
	Appropriation		$ 300.00	
	Supplemental Appropriation (From Miscellaneous, New York County, 3225 N. Y. County Fund for Salary and Wage Accruals)		110.63	$ 410.63
	Expended			410.63
Line 15	Carfares:			
	Appropriation			$ 50.00
	Expended			50.00
Line 16	Express and Deliveries:			
	Appropriation			$ 300.00
	Expended			300.00
Line 17	Contingencies:			
	Appropriation			$ 100.00
	Expended			100.00
Summary of Tax Budget Accounts:				
	Appropriated		$ 87,948.00	
	Supplemental Appropriation		1,640.63	$ 89,588.63
	Expended			$ 89,588.63

II. Private Funds Accounts

1. *Endowment Fund* ($50,500.00) *Restricted in Part:*			
Income Account:			
Income 1927			$ 2,777.48
Transferred to Endowment Increment Fund	$ 555.50		
Transferred to Special Contributions	2,221.98		2,777.48
			$ 0.00

2. *Life Membership Fund* ($6,500.00) *Restricted:*

Income Account:		
Income 1927		$ 320.82
Transferred to Endowment Increment Fund	$ 64.16	
Transferred to Annual Membership Account	256.66	320.82
		$ 0.00

3. *George C. Brackett Library Fund* ($500.00) *Restricted:*

Income Account:		
Balance, January 1, 1927	$ 1.15	
Income 1927	28.48	$ 29.63
Expended	$ 11.00	
Transferred to Endowment Increment Fund	5.49	16.49
Balance, December 31, 1927		$ 13.14

4. *Benjamin Stuart Gager Memorial Fund* ($13,417.27) *Restricted:*

Income Account:		
Balance, January 1, 1927	$ 657.72	
Income 1927	737.92	$ 1,395.64
Expended	$ 572.04	
Transferred to Endowment Increment Fund	147.58	719.62
Balance, December 31, 1927		$ 676.02

5. *Martha Woodward Stutzer Memorial Fund* ($10,000.00) *Restricted:*

Income Account:		
Balance, January 1, 1927	$ 36.63	
Income 1927	527.09	$ 563.72
Expended	$ 164.11	
Transferred to Endowment Increment Fund	105.42	269.53
Balance, December 31, 1927		$ 294.19

6. *Mary Bates Spalding Fund* ($2,697.00) *Restricted:*

Income Account:		
Balance, January 1, 1927	$ 40.73	
Income 1927	143.74	$ 184.47
Transferred to Endowment Increment Fund		28.75
Balance, December 31, 1927		$ 155.72

7. *Special Account W.* ($243,149.27) *Restricted:*

Income Account:			
Balance, January 1, 1927		$ 400.00	
Income 1927		13,080.43	$ 13,480.43
Expended		$ 373.39	
Transferred to Endowment Increment Fund		2,616.09	
Transferred to Special Contributions	10,223.30		13,212.78
Balance, December 31, 1927			$ 267.65

8. *A. Augustus Healy Bequest* ($9,798.31) *Restricted:*

Income Account:			
Income 1927			$ 538.88
Transferred to Endowment Increment Fund	$ 107.78		
Transferred to Special Contributions	431.10		538.88
			$ 0.00

9. *Robert B. Woodward Bequest* ($25,000.00) *Restricted:*

Income Account:			
Income 1927			$ 1,375.00
Transferred to Endowment Increment Fund	$ 275.00		
Transferred to Special Contributions	1,100.00		1,375.00
			$ 0.00

10. *A. T. White Memorial Tablet Fund* ($3,889.85) *Restricted:*

Income Account:			
Income 1927			$ 213.92
Transferred to Endowment Increment Fund	$ 42.78		
Transferred to Special Contributions	171.14		213.92
			$ 0.00

11. *Brooklyn Institute Centennial Fund B.B.G. Share* ($30,000.00) *Restricted:*

Income Account:			
Income 1927			$ 1,650.00
Transferred to Endowment Increment Fund	$ 330.00		
Transferred to Special Contributions	1,320.00		1,650.00
			$ 0.00

12. *John D. Rockefeller, Jr., Fund* ($250,000.00) *Restricted:*

Income Account:			
Balance, January 1, 1927		$ 1,421.53	
Income 1927		13,915.62	$ 15,337.15

Expended	$ 5,067.84	
Transferred to Endowment Increment Fund	3,067.43	
Transferred to Special Contributions	3,500.00	11,635.27
Balance, December 31, 1927		$ 3,701.88

13. *Citizens Endowment Fund* ($253,929.26) *Restricted:*

Income Account:		
Balance, January 1, 1927	$ 1,565.21	
Income 1927	13,828.83	$ 15,394.04
Transferred to Endowment Increment Fund	$ 3,078.81	
Transferred to Special Contributions	12,315.23	15,394.04
		$ 0.00

14. *Sustaining Membership. Restricted:*

Balance, January 1, 1927	$ 66.64	
Received from dues 1927	616.46	$ 683.10
Transferred to Annual Membership Account		683.10
		$ 0.00

15. *Annual Membership. Restricted:*

Balance, January 1, 1927	$ 1,128.04	
Received from dues 1927	6,029.00	
Transferred from Life Membership	256.66	
Transferred from Sustaining Membership	683.10	$ 8,096.80
Expended	$ 4,740.13	
Transferred to Special Contributions	1,500.00	6,240.13
Balance, December 31, 1927		$ 1,856.67

16. *Tuition and Sales. Restricted:*

Balance, January 1, 1927	$ 1,173.64	
Received 1927:		
a. Tuition	1,195.25	
b. Seed Packets	6,960.72	
c. Sales	203.01	$ 9,532.62
Expended	$ 7,890.35	
Transferred to Endowment Increment Fund	1,389.90	9,280.25
Balance, December 31, 1927		$ 252.37

17. *Botanic Garden Collections Fund 1927. Restricted:*

Balance, January 1, 1927	$ 277.37	
Received from Contributions	9,886.00	$ 10,163.37
Expended		6,368.19
Balance, December 31, 1927		$ 3,795.18

18. *Special Fund (Brooklyn Institute General Endowment Income: Annual Allotment) Restricted:*

Income Account:		
Income 1927		$ 2,840.00
Transferred to Special Contributions		2,840.00
		$ 0.00

19. *Cary Library Fund ($10,000.00—1/5 of Income to Brooklyn Botanic Garden) Restricted:*

Balance, January 1, 1927	$ 1.86	
Income Allotment 1927	110.00	$ 111.86
Expended	$ 17.59	
Transferred to Endowment Increment Fund	22.00	39.59
Balance, December 31, 1927		$ 72.27

20. *Special Purposes. Restricted by Terms of Gifts:*

Balance, January 1, 1927	$ 853.68	
Received:		
a. Anonymous for Japanese Garden	500.00	
b. Various for Test Garden for Japanese Iris	350.00	
c. Various for Fern Distribution	4.00	
d. Various for Drinking Fountain (secured by Mrs. Glentworth R. Butler)	1,300.00	
e. Rose Garden (gift of Mr. and Mrs. Walter V. Cranford)	15,000.00	
f. For Printing Flower Games Booklet (Boys and Girls Club)	20.00	$ 18,027.68
Expended		15,006.32
Balance, December 31, 1927		$ 3,021.36

21. *Plant Pathology Research Fund. Restricted:*

Balance, January 1, 1927	$ 2,591.93	
Income 1927	10,000.00	$ 12,591.93

Expended	$ 1,223.63	
Transferred to Special Contributions	8,364.00	9,587.63
Balance, December 31, 1927		$ 3,004.30

22. *Special Contributions (for 1927 only):*

Balance, January 1, 1927	$ 425.55	
Transferred from		
Endowment Fund Income Account	2,221.98	
Special Account W. Income Account	10,223.30	
A. Augustus Healy Bequest Income Account	431.10	
R. B. Woodward Bequest Income Account	1,100.00	
A. T. White Memorial Tablet Fund Inc. Account	171.14	
Brooklyn Inst. Centennial Fund Inc. Acct.	1,320.00	
J. D. Rockefeller, Jr. Fund Income Account	3,500.00	
Citizens Endowment Fund Income Account	12,315.23	
Annual Membership Account	1,500.00	
Special Fund (Inst. General Endowment)	2,840.00	
Plant Pathology Research Fund	8,364.00	$ 44,412.30
Expended		44,239.76
Balance, December 31, 1927		$ 172.54

23. *Endowment Increment Fund* ($46,693.29) *Restricted:*

Transferred from other accounts, 1927	$ 11,836.69	
Interest 1927	1,883.66	$ 13,720.35
Transferred to Principal		13,720.35
		$ 0.00

Summary of Private Funds Accounts:

Balances, January 1, 1927	$ 10,641.68	
Income 1927	106,036.31	$116,677.99
Expended	$ 85,674.35	
Transferred to Endowment Increment Fund Principal	13,720.35	99,394.70
Balances, December 31, 1927		$ 17,283.29

III. Summary of Total Maintenance Budget for 1927

Income

Tax Budget Appropriation (43.4%)		$ 89,588.63
Private Funds Budget (56.6%)		116,677.99
Total		$206,266.62
Tranferred to Endowment Increment Fund Principal		13,720.35
Available		$192,546.27

Expended

Personal Service			
Tax Budget	$ 72,253.00		
Private Funds	51,442.82		
Total		$123,695.82	
Other than Personal Service			
Tax Budget	$ 17,335.63		
Private Funds	34,231.53		
Total		$ 51,567.16	$175,262.98
Balance, December 31, 1927			$ 17,283.29

Respectfully submitted,

DANIEL C. DOWNS,
Secretary and Accountant.

Note:—The above "Financial Statement" is a transcript of Brooklyn Botanic Garden accounts in the books of the Treasurer of the Brooklyn Institute of Arts and Sciences. The Treasurer's accounts are audited annually by a Public Accountant, and a separate audit of this "Financial Statement" is not made in order to save unnecessary expense.

G. FOSTER SMITH,
Treasurer.

APPENDIX 1

GIFTS RECEIVED DURING 1927

Collections Fund

Miss Ida M. Angell
Miss E. Addie Austin
Frank L. Babbott
Mrs. Glentworth R. Butler
Walter H. Crittenden
Mrs. Alice C. Crowell
Mrs. John R. Delafield
Otto Ebel
Walter Ebel
Gates D. Fahnestock
Mrs. Lewis W. Francis
John W. Frothingham
Mrs. A. Augustus Healy
Mrs. N. P. Heffley
Mr. and Mrs. James M. Hills
Miss C. Julie Husson
Edward A. Ingraham
A. W. Jenkins
Ralph Jonas
Mrs. A. S. Kirkman
Miss Hilda Loines
Miss Florence E. Longstreet
William G. Low
Miss Theresa Mitchell
Mrs. James L. Morgan
Miss Caroline Plant
Mrs. Frederic B. Pratt
George D. Pratt
William A. Putnam
Mrs. William A. Putnam
Harold Somers
Dr. Edward H. Squibb
Mrs. Seth Thayer Stewart
Herman Stutzer
Mrs. Herman Stutzer
Miss Anna T. Van Nostrand
"C. W."
Robert Weber
Miss Francis E. White
Miss Harriet H. White
Harold T. White

Living Plants

American Rose Society, 2 Roses.
Dr. R. C. Benedict, 2 *Scilla maritima.*
Mr. Bieschke, 3 *Nidularium striatum.*
Judge and Mrs. George S. Brown, 1 Burbank Walnut.
Mr. George Buchanan, 4 Orchids.
Mr. Arthur L. Clark, 1 *Araucaria imbricata,* 1 *Gevuina Avellana.*
Mrs. John W. Draper, 1 Begonia.
Dr. Arthur H. Graves, 1 *Rosa virginiana,* 1 *Rosa spinosissima.*
Herbst Brothers, 1 Tenerife Cavendish Banana, 5 *Carludovica palmata.*
Mrs. Charles F. Keller, 1 *Rubus laciniatus.*
Mrs. Richard M. Liptrott, 1 *Abutilon hybridum.*
Mr. Joseph Nangano, 1 *Jasminum grandiflorum.*
Mrs. W. L. Peters, 3 *Zantedeschia albo-maculata.*
Mrs. C. N. Pratt, 13 Japanese maples.
Mrs. Ida M. Ratcliffe, 1 Plant.
Mrs. E. Root, 1 *Shepherdia canadensis.*
Mrs. Rothenburg, 1 *Amorphophallus Rivieri.*

Mrs. Shaw, Begonia seedlings, Blue Star-of-Bethlehem.
Sunnybrook Iris Garden, 8 var. Siberian Iris.
Miss Theodora Van Name, 1 tall bearded Iris.
Wolfgang, Florist, 4 *Sambucus canadensis*, 12 slips *Salix discolor floribunda*, 1 Ampelopsis quinquefolia.
John Lewis Childs, Inc. 23 var. Japanese Iris.

Seeds

Mr. and Mrs. A. T. Beal (1)
Mr. L. Canton (3)
Professor Charles J. Chamberlin (1)
Mr. Arthur L. Clark (5)
Mrs. S. W. Draper (1)
Dr. C. Stuart Gager (13)
Mr. W. Jack (1)

Phanerogamic Herbarium

American Museum of Natural History, 34 specimens from New Hebrides Islands.
Mr. A. T. Beals, 10 specimens from Greenpond, N. Y.
Miss Lucy Braun, 1 specimen.
Dr. J. A. Drushel, 17 Herbarium specimens.
Mrs. L. Holtzoff, 501 Herbarium specimens.
Mr. Winfried Roelker, 350 Herbarium specimens.
Dr. O. E. White, 28 specimens from Cuba.

Cryptogamic Herbarium

No accessions by gift during 1927.

Iris Project

Special Fund

Mrs. Wheeler H. Peckham	$ 50.00
Mrs. Willard C. Brinton	100.00
American Iris Society	100.00
Brooklyn Botanic Garden	100.00
	$ 350.00

Plants

Gifts of Plants for the Iris Project are listed on page 55.

For Bubbler Drinking Fountain

(Through Mrs. Glentworth R. Butler):

Anonymous	$150.00	
Mrs. Edward C. Blum	150.00	
Mrs. William H. Childs	250.00	
Mrs. Frank H. Davol	150.00	
Mrs. John E. Leech	150.00	
Mrs. William W. Marshall	150.00	
Mrs. Edwin P. Maynard	150.00	
Mrs. Adrian Van Sinderen	150.00	$1,300.00

For Rose Garden

Mr. and Mrs. Walter V. Cranford $15,000.00

Miscellaneous

For Japanese Garden		
Anonymous	$ 500.00	
For Fern Distribution	4.00	
Blanche McAvoy		
S. Fred Wright		
Mrs. Samuel M. Monks		
For Printing Flower Games Booklet		
Boys and Girls Club (B.B.G.)	20.00	

Library

(Exclusive of Government Documents)

Books

Carnegie Institution of Washington, Washington, D. C.	2
Mr. George F. Corby, 22 Overlook Avenue, West Orange, N. J.	2
Mr. H. Edward Corby, 22 Overlook Avenue, West Orange, N. J.	1
Editorial Board of Hugo de Vries' "Opera e Periodicis Collata"	1
Dr. C. Stuart Gager, Brooklyn, N. Y.	31
Mrs. C. Stuart Gager, Brooklyn, N. Y.	1
Mr. Bernard Goodman, 756 Nostrand Avenue, Brooklyn, N. Y.	1
Master Jack Goodman, 756 Nostrand Avenue, Brooklyn, N. Y.	1
Dr. A. H. Graves, Brooklyn, N. Y.	1
Mrs. Helen Smith Hill, Brooklyn, N. Y.	1
Mrs. Clarence R. Hyde, Brooklyn, N. Y.	2
Master Stuart Jefferson, 8 Norman Road, Upper Montclair, N. J.	1
Miss Diana Colburn Keiser, Brooklyn, N. Y.	1

Mrs. Francis King, Orchard House, Alma, Michigan 1
Long Island Historical Society, Brooklyn, N. Y. 1
Long Island State Park Commission 1
New York State Library, Albany, N. Y. 2
New York State Museum, Albany, N. Y. 1
Miss Emma Peirce, 1447 Fenimore Street, Washington, D. C. 1
Mr. A. J. Pratt, 353 East 22d Street, Brooklyn, N. Y. 1
Mrs. Janet Pratt, 353 East 22d Street, Brooklyn, N. Y. 1
Mr. Robertson Pratt, 353 East 22d Street, Brooklyn, N. Y. 3
Mr. William C. Redfield, Washington, D. C. 1
Miss Mae Reed, 806 Classon Avenue, Brooklyn, N. Y. 3
Miss Madeline Reynolds, Kirkland Street, Cambridge, Mass. 2
Royal Botanic Gardens, Kew, England 5
Miss Etta Simpson, Glenbrook, Connecticut 8
Miss Ray Simpson, Brooklyn, N. Y. 3
Mr. Norman Taylor, Brooklyn, N. Y. 3
Mrs. R. Von Lehn, 464 East 24th Street, Brooklyn, N. Y. 2
Miss Harriet H. White, Brooklyn, N. Y. 1
Miss Edna Whitmarsh, 458 Lincoln Place, Brooklyn, N. Y. 1
Miss Ethel V. Woodward, Brooklyn, N. Y. 3

Total 90

Pamphlets

American Association of Museums, Washington, D. C. 1
American Tree Association, Washington, D. C. 1
Prof. Dr. Alexandre Borza, University of Cluj, Cluj, Roumania 1
Brooklyn Museum Library, Brooklyn, N. Y. 4
Prof. J. T. Buchholz, Fayetteville, Arkansas 3
Carnegie Institution of Washington, Washington, D. C. 11
Central Turf Station, Moscow, Russia 1
Dr. C. B. Davenport, Cold Spring Harbor, L. I. 1
Dr. O. A. Farwell, Detroit, Michigan 3
Mr. L. Fenaroli, Milan, Italy 1
Dr. C. Stuart Gager, Brooklyn, N. Y. 139
Prof. R. R. Gates, King's College, London, England 2
Dr. A. H. Graves, Brooklyn, N. Y. 7
Dr. A. Gundersen, Brooklyn, N. Y. 6
Prof. F. E. Lloyd, McGill University, Montreal, Canada 4
Long Island Historical Society, Brooklyn, N. Y. 1
Medical Society of the County of Kings, 1313 Bedford Avenue, Brooklyn, N. Y. 2
Meguro, Tokyo, Japan, Forestry Experiment Station 1
Northern Hemlock & Hardwood Manufacturing Association, Oshkosh, Wisconsin 1

Prof. L. H. Pammel, Botany Department, Iowa State College, Ames, Iowa	1
Dr. H. S. Reed, Citrus Experiment Station, Riverside, California	5
Dr. William J. Robbins, University of Missouri, Columbia, Mo.	2
Dr. H. H. Rusby, College of Pharmacy of New York City	6
Dr. M. J. Sirks, Wageningen, Holland	2
Mr. Norman Taylor, Brooklyn, N. Y.	16
Total	222

Parts of Publications

American Eagle, Estero, Florida	12
American Eugenics Society, 185 Church Street, New Haven, Conn.	1
Dr. R. C. Benedict, Brooklyn, N. Y.	2
Brooklyn Museum Library, Brooklyn, N. Y.	2
Carnegie Institution of Washington, Washington, D. C.	3
Dahlia Society of New Jersey	1
Mr. Montague Free, Brooklyn, N. Y.	12
Dr. C. Suart Gager, Brooklyn, N. Y.	312
Garden Club of America, New York	5
Dr. A. H. Graves, Brooklyn, N. Y.	9
Lloyd Library, Cincinnati, Ohio	50
Miss Hilda M. Loines, Brooklyn, N. Y.	2
Mr. Barrington Moore, 1520 K Street, Washington, D. C.	4
Morton Arboretum, Lisle, Illinois	1
National Plant, Flower and Fruit Guild, New York	2
New York Academy of Sciences, New York	27
New York City, Department of Health	36
Placer County Fruit Growers' Association, Auburn, California	1
Miss Helen E. Saunders, 454 Seventh Avenue, Brooklyn, N. Y.	19
School Garden Association of New York	8
Mrs. Annie Morrill Smith, Bronxville, N. Y.	5
Mr. Norman Taylor, Brooklyn, N. Y.	144
Miss Katharine B. Timpson, 55 Sound View Avenue, New Rochelle, N. Y.	1
Prof. A. D. Whedon, North Dakota Agricultural College, Fargo, N. D.	1
Dr. O. E. White, University of Virginia, University, Va.	38
Wild Flower Preservation Society, Cincinnati, Ohio	2
Woman's National Farm & Garden Association, New York	5
Total	705

Portraits

Miss Emma Durant, 66 East 190th Street, New York City	5
Mr. C. G. Lloyd, 309 West Court Street, Cincinnati, Ohio	1
Dr. O. E. White, University of Virginia, University, Va.	1
Total	7

For the Department of Elementary Instruction

Blatt, Natalie, $2 for the children's library.

Boys' and Girls' Club, the Staff of Agricola and the Agricola Fund, one typewriter table.

Boys' and Girls' Club, $20 for the printing of the booklet, "Flower Games."

Boys and girls, older members of the Boys' and Girls' Club, books for the children's library.

Butler, Mrs. Glentworth R., One prize cup, competed for by the girls in the outdoor garden.

Chiropean Club, $4 for the children's library.

Clark, Miss Mary Wells, Wild flower seeds from California.

Coco-Cola Company, 1,000 sets of wild flower cards.

Devereau View Company, Colored slide.

Driggs, Miss Alice, Flower books for the child who showed the greatest interest in flowers in the outdoor garden.

Du Val, Mrs. Guy, Fish globe and Japanese fish for children's room.

Evans, Mrs. George, Nature material, catalpa pods and "wood" flowers.

Fairbanks, Miss M. B., Cactus from Aetna, Kansas.

Flatbush Garden League (through Mrs. E. L. Carson), Prize books for greatest improvement made by a first year child in the outdoor garden.

Gager, Mrs. C. Suart, One book for the children's ilbrary.

Gager, Mrs. C. Stuart, Two water plants and vase, for the children's garden house.

Gager, Dr. C. Stuart, Three books for the children's library.

Gager, Prudence, One flower game, "Jeu des Fleurs," from Switzerland, for the Boys' and Girls' Club.

Garden Teachers' Association, One prize cup competed for by the boys in the outdoor garden.

Goodman, Bernard and Jack, $3.50 for the children's library.

Hunter, Mrs. J. L., Holly berries.

Hyde, Mrs. Clarence R., One wild flower chart.

Hyde, Mrs. Clarence R., One volume of "Wild Flowers of America", a set of illustrations, for the children's library.

King, Mrs. Francis, One book, by Mrs. King, for the children's library.

Kottruff, Packardt and Company, Many samples of concentrated plant food.

Lehn, Mrs. Richard von, $5 for the children's library.

Marcum, Miss Sara, Cotton seed.

Mitchell, Mrs. E. W., Number of pictures of apple blossom sprays.

The News, Brooklyn Section, Two pictures of children making candles at the Brooklyn Botanic Garden.

Peirce, Mrs. Emma, One book, by Mrs. Peirce, for the children's library.

Peter Henderson and Company, Sample packages of barley, oats, rye, wheat and flax.

Pond, Miss Pearl F., Christmas images, The Holy Family, Three Wise Men, Shepherds, etc.

Pratt, Robertson, One book for the children's library.
Prince, Miss Helen, Cotton seed.
Pront, Mr. A., Balloons for the children's ice cream party.
Raymond, Mrs. Alma H., 15 different kinds of plants for the children's perennial border.
Shaw, Miss Ellen Eddy, Two gold honor pins for honorable service in the outdoor garden.
Shaw, Miss Ellen Eddy, Three year's subscription to the "Country Gentleman" for the children's library.
Simpson, Miss Etta, $5 for the children's library.
St. Brigid's School (A class visiting the Garden) $2.40 for the children's library.
Synthetic Nitrogen Products Company, 50 samples of concentrated plant food.
Taylor, Mr. Norman, One book for the children's library.
Women's Benevolent Society of the Marcy Avenue Baptist Church, $10 for the children's fund.

APPENDIX 2

PUBLICATIONS OF MEMBERS OF STAFF DURING 1927

Gager, C. Stuart

—— Sixteenth Annual Report of the Brooklyn Botanic Garden, 1926. Report of the Director. *Brooklyn Bot. Gard. Rec.* **16**: 1–24. April.

—— Educational work of botanic gardens. *The Nature Almanac*. Am. Nature Assoc., Washington, D. C., pp. 83–85.

—— [and A. F. Blakeslee]. Chromosome and Gene Mutations in Datura following exposure to radium rays. *Proc. Nat. Acad. Sci.* **13**: 75–79. February.

Benedict, Ralph C.

—— Is the distribution and naturalization of the Hart's Tongue scientifically defensible? *Amer. Fern Jour.* **17**: 19–21. January–March.

—— Sixteenth Annual Report of the Brooklyn Botanic Garden. Studies of the variation of the Boston Fern (Nephrolepis). *Brooklyn Bot. Gard. Rec.* **16**: 33–35. April.

Clark, Kathryn P.

—— Flower Games (in collaboration with members of the Boys' and Girls' Club). 24 pp. December.

Free, Montague

—— Epiphytes and house plants. *Brooklyn Bot. Gard. Leaflets* **XV**[1]. March.

—— Sixteenth Annual Report of the Brooklyn Botanic Garden. Report of the Horticulturist. *Brooklyn Bot. Gard. Rec.* **16**: 61–64. April.

Graves, Arthur Harmount

—— Report of work in forest pathology for 1926. *Brooklyn Bot. Gard. Rec.* **16**: 45–48. April.

—— Report of the Curator of Public Instruction for 1926. *Brooklyn Bot. Gard. Rec.* **16**: 64–68. April.

—— What price Christmas greens? *Brooklyn Bot. Gard. Leaflets* **15**[11-12]: 1–8. November.

—— 72 newspaper articles relating to the Brooklyn Botanic Garden.

—— 10 abstracts of botanical books and papers in *Botanical Abstracts*, Vol. 15, 1926.

Gundersen, Alfred

—— Delectus Seminum (1927 Seed List). *Brooklyn Bot. Gard. Rec.* **16**: January (with Mr. Free).

—— Report of the Curator of Plants for 1926. *Brooklyn Bot. Gard. Rec.* **16**: 56–58. April.

—— Families of Vascular Plants (except Dicotyledons). *Brooklyn Bot. Gard Leaflets* **15**[4]: 1–4. May.

—— The Frankeniaceae as a Link in the Classification of Dicotyledons. *Torreya* **27**: 65–71. July–August.

—— International Seed Exchange, Communication No. 8. October. (With Dr. C. S. Gager.)

—— Various abstracts for *Biological Abstracts*.

Neff, Dorothy I., and Orland E. White

—— Inheritance studies in Pisum. VI. Multiple allelomorphism and the inheritance of green and yellow foliage and pod color. *Amer. Jour. Bot.* **14**: 379–394. July.

Reed, George M.

—— Further evidence of physiologic races of oat smuts. *Mycologia* **19**: 21–28. January–February.

—— Plant Pathology. *Brooklyn Bot. Gard. Rec.* **16**: 37–45. April.

Reed, George M., Marjorie Swabey and Laura A. Kolk
—— Experimental studies on head smut of corn and sorghum. *Bull. Torrey Bot. Club* **54**: 295–310. April.

Rusk, Hester M.
—— Torrey Botanical Club Field Day. *Torreya* **27**: 75–77.

Simpson, Ray
—— Report of the Librarian for 1926. *Brooklyn Bot. Gard. Rec.* **16**: 74–80. April.

Shaw, Ellen Eddy
—— Kindergarten School Garden. The Kindergarten Round Robin. April.
—— Report of the Curator of Elementary Instruction. *Brooklyn Bot. Gard. Rec.* **16**: 70–72. April.
—— Children's Gardens. An important phase of Guild Work. *The Natl. Plant, Flower and Fruit Guild Mag.* **16**: 3. May.
—— Children's work at the Brooklyn Botanic Garden. *Science Newsletter.* August 13.
—— The following articles appeared in the *New York Sun* on the dates indicated:

Advice for those who have window boxes and those who want one. March 12.

Are your house plants tired and weary? Here's the cure! March 14.

First lesson for the gardener with list of seeds to plant. March 18.

This key to fertilization of the soil unlocks a difficult garden problem. March 25.

Introducing the gardener to the soil. Requirements of plant life. March 29.

Preliminary work to be done now to put garden soil in condition. April 1.

Last call for gardeners to start sowing seeds in indoor boxes. April 2.

Planting may be started now—begin with roses and sweet peas. April 8.

Order your flowering shrubs now. It's time to set them in the garden. April 13.

You would like to have a garden? Start now—there's plenty of time! April 15.
The all-year-round garden. April 22.
The suburbanite gets to work in his garden. April 26.
Why not have vegetables in your back yard? April 26.
Planting the outdoor garden. April 29.
Protect your trees and flowers from insect pests. May 20.
Plant in August and September and reap the reward of beauty in a richly blooming garden early next year. August 11.
Plan the outdoor bulb bed now so that September will find you ready. August 25.
Begin fall garden operations if you would have beauty all year. September 9.
Blooms for Thanksgiving? They are possible if you follow this plan. October 21.
Ferns as house plants. October 28.
Cape Colony bulbs. Lily-of-the-Valley Pips. Ways to cultivate them. November 11.
The window box. November 25.

Taylor, Norman

—— Romance of the fungus world. *Saturday Review of Literature,* 26 February.
—— Trees and shrubs of California gardens. *Saturday Review of Literature,* 26 February.
—— Life of plants. *Saturday Review of Literature,* 26 February.
—— The climate of Long Island, its relation to forests, crops, and man. *Cornell Univ. Agr. Exp. Sta. Bull.* **458**: 1–20. March.
—— Walking with an object. *Torreya* **27**: 29–35. April.
—— Report of the curator of plants for 1926. *Brooklyn Bot. Gard. Rec.* **16**: 60. April.
—— Age and area. *Ecology* **8**: 283–284. April.
—— Cultivation of American woodland plants. *Yearbook Hort. Soc. N. Y.* **1927**: 40–45. August.
—— Plants of the past. *Saturday Review of Literature.* November 6.

—— 1927 Supplement to author's "Botany the science of plant life." P. F. Collier and Son. December.
—— Three abstracts of scientific papers relating to ecology and plant geography in *Biological Abstracts*.

Taylor, Norman, and Barrington Moore

—— Vegetation of Mount Desert Island, Maine, and its environment. *Brooklyn Bot. Gard. Memoirs* **3**: 1–151. June.

White, Orland E.

—— Our common garden vegetables. Their history and origin. (Revised reprint.) *Brooklyn Bot. Gard. Leaflets* **XV**[8–10]. June.
—— The biology of population growth. (Book review.) *Birth Control Review* **11**: 52–53. February.
—— "Hardiness," mutation, and the geographical distribution of plants. *Brooklyn Bot. Gard. Rec.* **16**: 30–32. April.
—— Report of the Curator of Plant Breeding and Economic Plants for 1926. *Brooklyn Bot. Gard. Rec.* **16**: 51–56. April.

White, Orland E., Dorothy I. Neff, and Mary Ellen Peck

—— The genetic analysis of garden and field peas (*Pisum*). *Brooklyn Bot. Gard. Rec.* **16**: 26–29. April.

APPENDIX 3

TALKS, LECTURES, ADDRESSES, AND PAPERS GIVEN BY MEMBERS OF STAFF DURING 1927

By the Director of the Garden:

Feb. 23. *How the Botanist Works.* The School of the People's Institute. Manhattan Trade School.

April 26. *The importance of trees in a city.* American Association for the Planting and Preservation of City Trees, Junior League, Flatbush Chapter. Public School 99.

April 29. *The living plant.* Garden Club, Hastings-on-Hudson, New York.

May 25. *Religion and Science.* Flatbush Congregational Church, Brooklyn.

Nov. 4. *Wellesley College and the development of botanical education in America.* Wellesley, Mass.

Nov. 8. *Observations of a botanist in Europe.* Winter's Night Club, Brooklyn.

By the Curator of Public Instruction:

January 11. *Forestry.* Two talks. Thomas Jefferson High School.

January 25. *The value of real objects in nature education.* Conference of Museum Staffs. American Museum of Natural History.

April 6. *The crocus.* Crocus Day talk. Brooklyn Botanic Garden.

April 26. *Arbor Day.* Bay Ridge High School.

April 27. Arbor Day talk. *What our forests mean to us.* Boys' High School. Waverly Annex.

June 5. *Ornamental trees and shrubs for the home grounds.* Public lecture, Brooklyn Botanic Garden.

June 10. *How the Yosians can help.* Annual dinner of the Yosians. International House, N. Y. C.

June 16. *The conservation of wild flowers.* Headquarters of School Nature League. P. S. 42, Manhattan.

August 20. *The trees of greater New York.* New York Botanical Garden.

November 1. *A leaf.* James Madison High School; Annex. Brooklyn.

November 7. *Diseases of trees.* Medical Society of Boys' High School. Brooklyn Botanic Garden.

December 14. *Why leaves are green.* Waverly Annex, Boys' High School.

By the Curator of Elementary Instruction:

January 10. Germination. P. S. No. 48.

January 17. Types of little gardens. P. S. No. 48.

January 18. Everyday nature study. P. S. No. 185.

January 20. Little nature gardens. Birch Wathen School, New York.

January 24. Germination. P. S. No. 185.

March 1. Value of children's gardens. Brooklyn National Plant, Flower and Fruit Guild.

March 11. Wonders of the plant world. P. S. No. 149.

March 16. The teaching of gardening. American Museum of Natural History.
March 24. Nature and the child. Maxwell Training School for Teachers.
March 29. Gardening and the city child. Women's Auxiliary. At the Garden.
March 30. Spring wild flowers. P. S. No. 95, Queens.
April 1. Little gardens. P. S. No. 3.
April 1. School gardens. P. S. No. 9.
April 4. Backyard gardens. P. S. No. 14.
April 7. Backyard gardens. Mothers' Club, P. S. No. 201.
April 8. Plant Products of the United States. P. S. No. 150.
April 11. Children's work at the Brooklyn Botanic Garden. Chiropean Club. At the Garden.
April 12. Garden clubs and pleasure in gardens. Bellrose Women's Club, Bellrose, L. I.
April 13. Little gardens. P. S. No. 14.
April 25. Brooklyn Botanic Garden and its work. Pilgrim League. At the Flatbush Congregational Church.
April 26. Plant life. James Madison High School Annex.
April 27. Plant life. P. S. No. 165.
April 28. Plant life. Bay Ridge High School.
April 28. Backyard gardens. Mothers' Club, P. S. No. 113.
April 29. Plant life. P. S. No. 152.
April 29. Plant life. P. S. No. 174.
April 30. Children's gardens. New York Botanical Garden.
May 2. Children's gardens and work at the Brooklyn Botanic Garden. National Recreational School, New York University. At the Garden.
May 4. Little gardens. Democratic Club. Jackson Heights, L. I.
May 4. Nature study and plant life. P. S. No. 145.
May 5. Children's work at the Brooklyn Botanic Garden. Colonial Club. At the Garden.
May 6. Children's work at the Brooklyn Botanic Garden. Ruth E. Tappen Lecture. Maxwell Training School for Teachers.
May 9. The beginner's garden. Wilton Garden Club, Wilton, Conn.

May 11. School gardens. P. S. No. 46.
May 17. Gardens. P. S. No. 193.
May 17. Plant life. P. S. No. 205.
May 17. Children's work at the Brooklyn Botanic Garden. Mothers' Club, P. S. No. 161. At the Garden.
May 18. Children's work at the Brooklyn Botanic Garden. Mothers' Club. P. S. No. 2. At the Garden.
May 18. Children's work at the Brooklyn Botanic Garden. Mothers' Club, P. S. No. 39. At the Garden.
May 19. Summer nature work. Birch Wathen School, New York.
May 19. Children's work at the Brooklyn Botanic Garden. Mothers' Club, P. S. No. 123. At the Garden.
May 23. Children's work at the Brooklyn Botanic Garden. Bethany Memorial Kindergarten Mothers' League.
May 26. Children's work at the Brooklyn Botanic Garden. Public School Kindergarten Association, Brooklyn Section. At the Garden.
June 2. Children's work at the Brooklyn Botanic Garden. Mothers' Club, P. S. No. 106. At the Garden.
June 2. Children's work at the Brooklyn Botanic Garden. Mothers' Club, P. S. No. 108. At the Garden.
June 3. Children's gardens. P. S. No. 89, Queens.
June 4. The Brooklyn Botanic Garden. General William Stirling Society of the N. S. C. A. R. At the Garden.
June 7. Work with boys and girls at the Brooklyn Botanic Garden. Business Women's Club, Bedford Presbyterian Church.
June 9. The Brooklyn Botanic Garden. Anniversary Day Exercises, Marcy Avenue Baptist Church.
June 14. The Brooklyn Botanic Garden, also, Wild flowers. P. S. No. 165.
June 24. Talk at Graduation Exercises. P. S. No. 88, Queens.
June 24. Talk at Graduation Exercises. P. S. No. 47.
September 29. House plants. P. S. No. 36.
October 3. Making cuttings. Women's Exposition of Arts and Industries, Hotel Astor, New York.
October 4. House plants and diseased plants. Women's Exposition of Arts and Industries, Hotel Astor, New York.

October 5. Making cuttings and potting up cuttings. Women's Exposition of Arts and Industries, Hotel Astor, New York.

October 6. Plant propagation, house plants, bulbs, perennials. Garden Club, Englewood, New Jersey.

October 6. The work of the Brooklyn Botanic Garden. Kindergarten Mothers' Club, P. S. No. 66, Queens.

October 7. House plants. Women's Exposition of Arts and Industries, Hotel Astor, New York.

October 8. Window boxes. Women's Exposition of Arts and Industries, Hotel Astor, New York.

October 13. Interesting plants of foreign lands. Birch Wathen School, New York.

October 17. Children's work at the Brooklyn Botanic Garden. Madison Club.

October 18. Nature study and the child. Flatbush School.

October 20. Plants that make money and give us food and drink. P. S. No. 36.

October 21. The Brooklyn Botanic Garden. Manual Training High School.

November 7. Outdoors in the autumn. P. S. No. 139.

November 10. Shrubs and trees that have bright berries in the fall. P. S. No. 36.

November 11. Work at the Brooklyn Botanic Garden. Women's Auxiliary. At the Garden.

November 17. Thanksgiving dinner. P. S. No. 193.

November 19. Children's work at the Brooklyn Botanic Garden. National Recreational School, New York University. At the Garden.

November 21. Thanksgiving dinner. P. S. No. 173.

November 22. Thanksgiving dinner. P. S. No. 165.

November 23. Thanksgiving dinner. Birch Wathen School, New York.

November 28. Children's work at the Brooklyn Botanic Garden. Parents' Association of P. S. No. 41.

November 29. Children's work at the Brooklyn Botanic Garden, also, House plants. Rockville Centre Fortnightly Club, Rockville Centre, L. I.

December 5. Christmas greens. P. S. No. 40, Queens.
December 5. Nature study. Teachers' Conference, P. S. No. 27, Manhattan.
December 14. Christmas greens. Mothers' Club, P. S. No. 2.
December 19. Civic side of gardening. Brooklyn Women's Civic Club.
December 21. Christmas myths and stories. P. S. No. 182.
December 23. Christmas myths and stories. P. S. No. 36.

By the Assistant Curator of Elementary Instruction:

January 3. Winter buds and their promise. P. S. No. 48.
March 10. Wonders of plant life. P. S. No. 147.
April 8. Our debt to the birds. Chatsworth Avenue School, Larchmont, N. Y.
April 13. Backyard gardens. Mothers' Club, P. S. No. 127.
April 19. A little garden. Leonard St. Library.
April 26. Forests and their products. P. S. No. 165.
April 28. Birds, P. S. No. 77, Manhattan.
April 29. Forests and their products. P. S. 72.
April 29. Dependent America. P. S. No. 66.
May 16. Brooklyn Botanic Garden activities with children. Madison Club.
June 7. Children's work at the Brooklyn Botanic Garden. Mothers' Auxiliary of the Lewis Avenue Congregational Church. At the Garden.
October 6. Planting of bulbs. Women's Exposition of Arts and Industries, Hotel Astor, New York.
October 7. Children's work at the Brooklyn Botanic Garden. National Recreational School, New York University. At the Garden.
October 10. The perennial border. Garden Club, Sunnyside Gardens, L. I.
October 20. Plants of different climates. P. S. No. 181.
November 15. How to win nature honors in Brooklyn. "Guardians," Camp Fire Girls.
November 22. What the Brooklyn Botanic Garden offers for Camp Fire nature honors.
December 8. Forestry. P. S. No. 181

By Instructors:

May 11. Children's gardens at the Brooklyn Botanic Garden. Troy Women's Club, Troy, N. Y. Miss Clark.

October 20. Forestry. P. S. No. 165. Miss Sargent.

By the Curator of Plant Pathology:

May 9. Irises. New Rochelle Garden Club.

May 27. Irises. Riverdale Garden Club.

June 5. Irises. Botanic Garden.

By the Curator of Plants (Dr. Gundersen):

February 23. *A visit to European botanic gardens.* Torrey Bot. Club, N. Y. Bot. Garden.

April 26. *The daffodil.* Daffodil-Day Talk, Brooklyn Botanic Garden.

By the Curator of Plants (Mr. Taylor):

February 24. North American wild flowers and their cultivation. Horticultural Society of New York.

April 13. Cultivation of American wild flowers. Garden Club of the Oranges.

April 15. Cultivation of woodland plants. Garden Club of Essex Fells.

July and August. Eight lectures on ecology of the vegetation of Allegany State Park. Allegany School of Natural History.

December 13. Vegetation of Allegany State Park. Torrey Botanical Club.

By the Curator of Plant Breeding and Economic Plants:

February 3. The economic plants of the Bolivian Indians. Sigma Xi, University of Virginia.

July 11. The genetic analysis of peas. Pea Breeding Conference, University of Wisconsin.

September 12. Mutation, adaptation to temperature differences, and geographical distribution in plants. Fifth International Genetic Conference, Berlin, Germany.

By the Horticulturist:

February 10. *Rock gardens.* Cornell University, Ithaca, N. Y.

March 7. *Alpine and rock gardens.* Summit Garden Exchange, Summit, N. J.

April 26. *Trees and shrubs.* Station WPCH, New York, N. Y.

May 5. *Flower and vegetable seeds.* Station WPCH, New York, N. Y.

May 12. *Evergreens.* Station WPCH, New York, N. Y.

May 19. *Rock gardens.* Federated Garden Clubs of New York, Brooklyn Botanic Garden.

May 22. *Rock gardens.* Public lecture, Brooklyn Botanic Garden.

July 23. *Rock gardens.* New York Botanical Garden, New York.

August 30. *Rock gardens.* East Hampton Garden Club, East Hampton, L. I.

September 29. *Rock gardens.* Staten Island Garden Club, Staten Island, N. Y.

November 8. *Rock gardens.* American Horticultural Society, National Museum, Washington, D. C.

December 7. *Rock gardens.* East Orange Garden Club, East Orange, N. J.

By the Resident Investigator:

January 24. Some new and old biology. Congregational Church, Rockville Centre, New York.

October 13. Ferns. Department of Botany, Brooklyn Institute, Brooklyn, N. Y.

November 19. Ferns as house plants. New York Botanical Garden, New York.

By the Registrar and Custodian:

January 11. Value of nature study and how it may be taught. Cathedral College, Brooklyn, N. Y.

March 12. Nature's gardens. Northeastern Field Conference, Woodcraft League, Pennsylvania Hotel, New York.

April 9. Nature's gardens. Woodcraft League. Brooklyn Botanic Garden.

April 25. Nature's gardens. Scout Leaders' Training Course, Mineola, N. Y.

APPENDIX 4

REPORT ON BROOKLYN BOTANIC GARDEN PUBLICATIONS, 1927

American Journal of Botany

Published in cooperation with the Botanical Society of America. Volume XIV (1927) comprised ten issues, as usual, monthly (omitting August and September), with 51 papers and 643 pages, including a Supplement (published this year for the first time) comprising "Abstracts of the papers presented before the Physiological Section of the Botanical Society of America, Nashville, Tennessee, December 28–30, 1927." Four papers were published on the author-payment plan, according to which, if the author defrays the entire cost, the paper is published immediately. The expenses of the Supplement were defrayed by the Physiological Section of the Botanical Society of America and separate reprints of this Supplement were distributed to its members at the Scientific Meetings at Nashville. Dr. E. W. Sinnott, Connecticut Agricultural College, was appointed Editor-in-Chief at the beginning of the year, and Dr. Arthur Harmount Graves continued as member of the editorial board representing the Brooklyn Botanic Garden. The circulation of this Journal, as of November 30, 1927 (1490), is believed to be the largest in the world of any journal devoted exclusively to botanical research.

Ecology

Published in cooperation with the Ecological Society of America. The four issues of Volume VIII (1927) comprised 68 papers 496 pages, 7 plates and 53 text figures. Major Barrington Moore continued as Editor-in-Chief, and Mr. Norman Taylor as Representative of the Brooklyn Botanic Garden on the editorial board. The circulation as of November 30, 1927, was 1001.

Genetics

Published bi-monthly in cooperation with the Editorial Board of Genetics. Eight numbers were issued during the year, namely,

those for the months of September and November, 1926, and January, March, May, July, September, and November, 1927. The numbers issued in 1927 comprised 36 papers occupying 215 pages in Volume 11 (1926) and 587 pages in Volume 12 (1927), a total of 802 pages. The July, 1926 number was issued December 24, 1926, and was therefore not reported in our preceding Annual Report. The circulation, as of November 30, 1927, was 574.

Brooklyn Botanic Garden Record

Volume XVI (1927) of the quarterly Record (230 pages) comprised, as usual, the annual *Delectus Seminum,* or List of Seeds offered in exchange with other Gardens, the *Annual Report,* the educational Prospectus, and miscellaneous articles and notes concerning the Botanic Garden. Volume XVI comprised 230 pages.

Leaflets

This popular publication completed its fifteenth year with the publication of Series XV, double number 11–12 (Nov. 30), entitled "What Price Christmas Greens?" This number was fully distributed at the Exhibit of winter bouquets, held at the Garden December 12–17, 1927, and has been several times reprinted, in whole or in part, in daily papers. Double number 8–10 (June 8) was a reprint of Series VI, No. 3 (1918), "Our common garden vegetables, their history and their origin," by Dr. Orland E. White.

Double number 5–7 (May 18), was a guide to the "Exhibit of living plants and other material illustrating various phases of research at the Brooklyn Botanic Garden," and number 1 (March 16), "Epiphytes and House Plants" was distributed in large quantity as a guide to the Garden's Exhibit at the Fourteenth International Flower Show, held at Grand Central Palace, March 21–26, 1927.

Contributions

Number 50 completed Volume 2. Five numbers (48–52) were published. The foreign exchange list for this series was considerably extended during the year.

Memoirs

Volume III, "Vegetation of Mount Desert Island, Maine, and its environment," by Barrington Moore and Norman Taylor (151 pp., 27 text figures, and vegetation map in colors), was issued June 10, 1927.

Research Published

The total number of research papers (of members of the staff and others) published by the Garden during 1927 was 156, occupying 2092 pages, an increase over 1926 of 42 papers and 272 pages. In addition, four papers by members of staff, comprising 49 pages, were published outside of Garden publications.

Foreign Circulation

In our preceding Annual Report attention was called to the importance of the Brooklyn Botanic Garden multiplying its local value through the attainment of world-wide service to botanical science and education. A definite approach to this ideal is reflected in the foreign circulation of our seven serial publications as follows, the figures representing the number of foreign countries in which the given publication circulates:

American Journal of Botany	47
Ecology	47
Genetics	36
Record	40
Leaflets	27
Contributions	33
Memoirs	16

APPENDIX 5

MEETINGS OF ORGANIZATIONS AT THE GARDEN, 1927

February 22. Girl Scouts, Troop 64.
March 29. Ladies Auxiliary of the Brooklyn Botanic Garden.
April 9. Woodcraft League.
April 11. Chiropean Club and Contemporary Club.

May 2. New York University (Mr. Dreushel) Nature Study Club.
May 5. Colonial Club.
May 7. League of Neighbors, Union of East and West and Reconciliation Tours.
May 17. Mothers' Club, P. S. 161.
May 18. Mothers' Club, P. S. 39.
May 18. Mothers' Club, P. S. 2.
May 19. Mothers' Club, P. S. 123.
May 19. Federated Garden Clubs.
May 26. Kindergarten Association.
June 2. Mothers' Club, P. S. 106.
June 2. Maplewood Garden Club.
June 2. Public School Kindergarten Association of Brooklyn.
June 3. American Iris Society.
June 4. General William Sterling Society of Children of American Revolution.
October 1. Department of Zoology, Brooklyn Institute. Beehive demonstration.
October 11. Torrey Botanical Club.
October 13. Department of Botany, Brooklyn Institute.
November 1. Ethical Culture School.
November 11. Womans Auxiliary, Brooklyn Botanic Garden.
November 19. National Recreation School.

APPENDIX 6

FIELD TRIPS CONDUCTED

By the Curator of Public Instruction:

April 10. Torrey Botanical Club. Palisades Interstate Park.
June 12. Yosian Club. Palisades Interstate Park.
September 24. Brooklyn Institute, Department of Botany. Palisades Interstate Park.
November 13. Appalachian Mountain Club, New York Branch. Manitou to Garrison, N. Y.
December 13. Biology Club of the Brooklyn Branch, College of the City of New York. Forest Park, Queens.

By the Curator of Plants (Dr. Gundersen):

May 8. Torrey Botanical Club. Coytesville, New Jersey.
September 2–3. Torrey Botanical Club. Catskill Mountains, New York.
November 19. Torrey Botanical Club. Palisades, New Jersey.

By the Curator of Plants (Mr. Taylor):

May 8. Torrey Botanical Club. Coytesville, New Jersey.
September 2–3. Torrey Botanical Club. Catskill Mountains, New York.
November 19. Torrey Botanical Club. Palisades, New Jersey.

By the Registrar and Custodian:

April 9. Woodcraft League. Brooklyn Botanic Garden and Prospect Park.
May 21. Department of Botany, Brooklyn Institute of Arts and Sciences. Hackensack, N. J.
May 22. Nassau County Training Council, B. S. A. Westbury, L. I. (Wheatley Hills.)
September 3–4. Nassau County Council, B. S. A. Wading River, L. I.
September 17. Torrey Botanical Club. VanCortlandt Park and Woodlawn Cemetery.
October 22. Department of Botany, Brooklyn Institute. W. R. Jenks estate, Morristown, N. J.

By Curatorial Assistant (Miss Rusk):

October 30. Torrey Botanical Club, Inwood, Manhattan.

APPENDIX 7

REPORT ON PHOTOGRAPHIC WORK, 1927

Negatives on file December 31, 1926		6,000
Negatives accessioned during 1927		400
Total negatives on file December 31, 1927		6,400
Lantern slides on file December 31, 1926		4,480
Lantern slides accessioned during 1927		420
Total lantern slides on file December 31, 1927		4,900
Prints on file December 31, 1926		2,376
Prints made during 1927	1,275	
Used or distributed	875	
Filed		400
Total prints on file December 31, 1927		2,776
Enlargements made		71

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(Revised to April 2, 1927)

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Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, Brooklyn, N. Y.* Telephone, 6173 Prospect.

The Botanic Garden is open free to the public daily from 8 a.m. until dark; on Sundays and Holidays open at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard (Malbone Street), and near Mt. Prospect Reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Montgomery Street.

To Assist Members and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one week in advance. No parties of less than six adults will be conducted.

To Reach the Garden take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, and Tompkins Avenue trolleys to Washington Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street and Vanderbilt Avenue trolleys to Prospect Park Plaza and Union Street.

PUBLICATIONS

OF THE

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RECORD. Established, January, 1912. An administrative periodical issued quarterly. Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, announcements of courses of instruction, seed list, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others one dollar a year; 25 cents a copy.

MEMOIRS. Established, July, 1918. Published irregularly.

Volume I. *Dedication Papers:* comprising 33 scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. 521 pages. Price $3.50, plus postage.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk: A study of grassland and forest. By Norman Taylor, June 11, 1923. 108 pages. Price $1.00, plus postage.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor, June 10, 1927. 151 pages. Price $1.60.

CONTRIBUTIONS. Established, April 1, 1911. Papers originally published in periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume.

44. Modes of infection of sorghums by loose kernel smut. 17 pages, 3 plates. 1925.

45. The inheritance of resistance of oat hybrids to loose smut. 19 pages. 1925.

46. Geographical distribution and the cold-resisting character of certain herbaceous perennial and woody plant groups. 10 pages. 1926.

47. The cause of the persistent development of basal shoots from blighted chestnut trees. 7 pages, 1 figure. 1926.

48. Further evidence of physiologic races of oat smuts. 8 pages. 1927.

49. Chromosome and gene mutations in Datura following exposure to radium rays. 5 pages. 1927.

50. The climate of Long Island; its relation to forests, crops, and man. 20 pages, 2 plates. 1927.

51. Experimental studies on head smut of corn and sorghum. 16 pages, 5 plates. 1927.

52. Inheritance studies in Pisum. VI. Multiple allelomorphism and the inheritance of green and yellow foliage and pod color. 16 pages. 1927.

55. Physiologic races of bunt of wheat. 14 pages. 1928.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication.

SEED LIST. Established, December, 1914. Since 1925 issued each year in the January number of the RECORD.

AMERICAN JOURNAL OF BOTANY. Established, January, 1914. Published, in coöperation with the BOTANICAL SOCIETY OF AMERICA, monthly, except during August and September. Subscription, $7.00 a year.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $4.00 a year.

GENETICS. Established, January, 1916. Bi-monthly. Subscription, $6.00 a year.

JUL 9 - 1928

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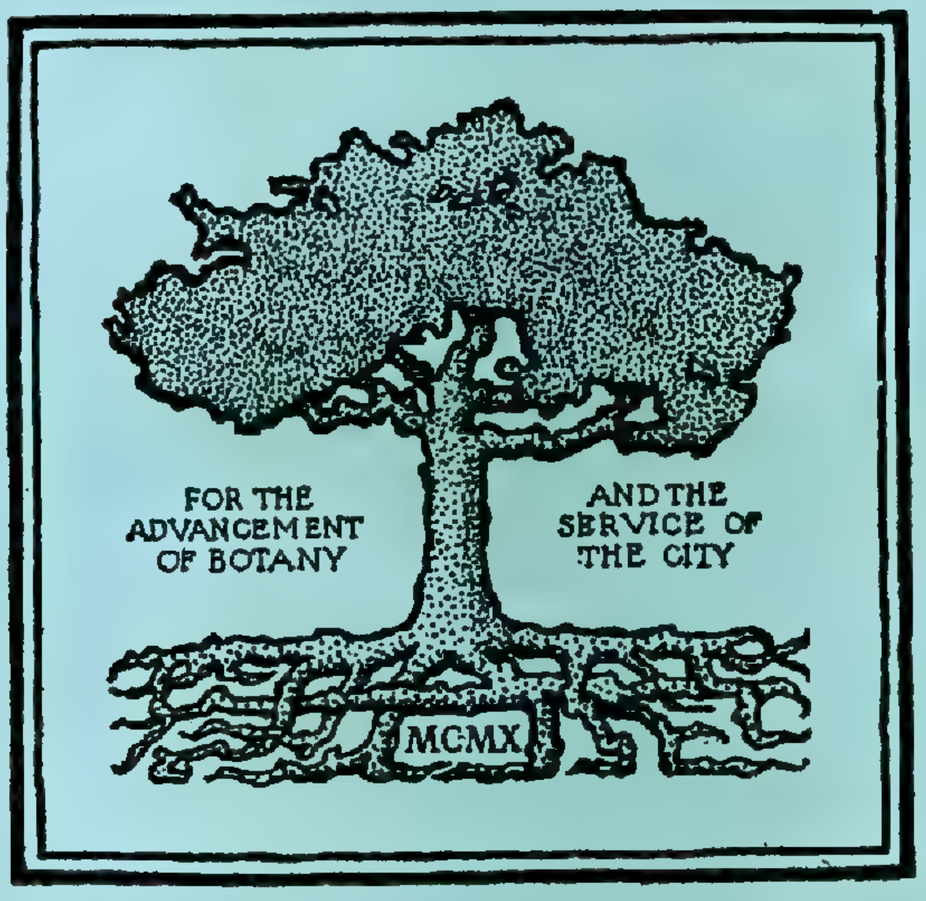

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BROOKLYN, N. Y.

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BROOKLYN BOTANIC GARDEN

Scientific, Educational, and Administrative Officers

SCIENTIFIC AND EDUCATIONAL

The Staff *

C. STUART GAGER, Ph.D., ScD., Pd.D., *Director*
MONTAGUE FREE, *Horticulturist*
ARTHUR HARMOUNT GRAVES, Ph.D., *Curator of Public Instruction*
ALFRED GUNDERSEN, Docteur de l'Université (Paris), *Curator of Plants*
ELSIE TWEMLOW HAMMOND, M.A., *Assistant Curator of Elementary Instruction*
GEORGE M. REED, Ph.D., *Curator of Plant Pathology*
ELLEN EDDY SHAW, B.S., *Curator of Elementary Instruction*
RAY SIMPSON, *Librarian*
———————, *Curator of Plant Breeding and Economic Plants*

Other Officers

MARY AVERILL, *Honorary Curator of Japanese Gardening and Floral Art*
HAROLD A. CAPARN, *Consulting Landscape Architect*

RALPH CURTISS BENEDICT, Ph.D., *Resident Investigator*
NORMAN TAYLOR, *Curator*

KATHRYN CLARK, A.B., *Instructor*
———————, *Research Assistant*
ZELDA J. SARGENT, *Instructor*
MARJORIE R. SWABEY, A.B., *Research Assistant*
ETHEL V. WOODWARD,† *Instructor*

EMILIE PERPALL CHICHESTER, *Library Assistant*
DOROTHY BARNETT, *Curatorial Assistant*
ALEXANDRA DODD SCHULTZE, *Curatorial Assistant*
MAUD H. PURDY, *Curatorial Assistant*
HESTER M. RUSK, A.M., *Curatorial Assistant*
MARGERY H. UDELL, *Curatorial Assistant*

ADMINISTRATIVE

DANIEL C. DOWNS, *Secretary and Accountant*
MAUDE E. VORIS, *Assistant Secretary*
BERTHA L. EDWARDS, *Office Assistant*
NORMA E. STOFFEL, *Office Assistant*

CAROLINE MARY DONALD, *Secretary to the Director*
FRANK STOLL, *Registrar and Custodian*
WILLIAM H. DURKIN, *Membership Secretary*

RUTH BLANKLEY, *Stenographer*
FRANCES MILLER MACKINNON, *Stenographer*

LOUIS BUHLE, *Photographer*

* The names are arranged alphabetically.

† Resigned January 31, 1928.

FACTS ABOUT THE BROOKLYN BOTANIC GARDEN[1]

FOREWORD

During the past few years the Brooklyn Botanic Garden has received many requests for statistical information concerning its plant, equipment, scientific and educational work, resources, method of financing, and other similar matters. These requests tend to increase each year. They come from individuals who wish, for various reasons, to know more about the Garden, from other similar institutions, from boards and committees initiating botanic gardens elsewhere, and from foundations and governmental bureaus. The Garden has never before published a concise statement giving all of this information in one place.

It is hoped that this statement will enable those interested to get a comprehensive view of our activities, resources, and needs, and that it will help many to recognize the educational, scientific, and civic importance of this work, and the opportunities for greater usefulness that depend chiefly on a larger and more stable income.

The demands for larger service are urgent and are increasing, and the Garden ventures to express the hope that the publication of these pages will not only make certain information readily accessible, put will enlarge the circle of its friends and lead many, who may not yet have done so, to include the Brooklyn Botanic Garden in their active benefactions and in their bequests.—C. STUART GAGER, *Director*.

[1] BROOKLYN BOTANIC GARDEN RECORD. Vol. XVII, No. 3. July, 1928.

PURPOSE

For the advancement and diffusion of a knowledge and love of plants.

"For the collection and culture of plants, flowers, shrubs and trees, the advancement of botanical science and knowledge, and the prosecution of original researches therein and in kindred subjects; for affording instruction in the same, and for the prosecution and exhibition of ornamental and decorative horticulture and gardening, and for the entertainment, recreation and instruction of the people." *From the Act of May 18, 1897, providing for the establishment of the Brooklyn Botanic Garden. Laws of New York, 1897, Chapter 509.*

GROUNDS AND BUILDINGS

1. **50 acres of land,** including the sites of buildings and a lake of about one acre.
2. **Laboratory building** containing
   - Lecture hall, seating 570
   - Library of 5 rooms
   - Herbarium room
   - 2 Classrooms
   - 5 Laboratory rooms
   - Exhibit room
   - Offices of administration
   - 13 Staff offices and private research rooms
   - Boys' and Girls' Club room
   - 6 Storage rooms
   - Herbarium work room
   - Seed room
3. **Plant Houses** (See p. 150)
4. **Children's Building**
5. **The assessed valuation of Botanic Garden property,** according to a report from the City of New York, Department of Taxes and Assessments, Borough of Brooklyn, received June 26, 1928, is as follows:

Land	$6,500,000
Buildings	500,000
Total	$7,000,000

PLANTATIONS

1. **Systematic Section,** comprising trees, shrubs, and herbaceous plants (chiefly those not found in the Local Flora area), grouped according to Orders and Families, and well labeled. Area about 14 acres.

2. **Native Wild Flower Garden (Local Flora Section),** comprising woody and herbaceous plants growing wild within a radius of approximately 100 miles of Brooklyn.

3. **Ecologic Garden,** including a swamp and portion of a *brook*, and illustrating the relation of plants to various factors of environment, such as water, light, gravity, soil, insects, other plants, etc.

4. **Rock Garden,** of about 12,000 square feet, containing nearly 1,000 species of Alpine and saxitile plants. This was the first rock garden in a public park in America.

5. **Japanese Garden,** of about one quarter of an acre, designed and constructed by Japanese. This, also, was the first Japanese Garden in a public park in America east of the Rocky Mountains.

6. **Rose Garden,** 500 feet long and 93 feet wide, enclosed by pavilion, pergolas, and trellis fence, and containing about 3,000 rose plants, arranged to show the historical development of the horticultural varieties.

7. **Iris Garden,** extending along either bank of the brook for about 400 feet, and including beds of Iris in other parts of the Botanic Garden.

8. **Water Gardens,** including East Indian Lotus (*Nelumbo*) Waterlilies, Cattails, and other water plants in the Lake and Brook; and two Waterlily Pools, each 95.5 feet long by 30.5 feet wide, one containing about 26 hardy species and varieties, and the other about 35 tender sorts (41 plants), including *Victoria regia Trickeri*), growing in water that is heated in spring and early summer.

9. **Children's Garden,** planted and cultivated by boys and girls of 6–18 years of age, including both vegetables and flowering plants, and accommodating about 200 children.

10. **Horticultural Garden,** comprising chiefly horticultural varieties of trees, shrubs, and herbaceous plants.

11. **Experimental Garden,** of about one acre, devoted to plant breeding, plant pathology, and other experimental cultures. Not open to the public.

12. **Nursery.** Not open to the public. About one quarter acre. Additional nursery is greatly needed.

PLANT HOUSES

The plant houses comprise the following:

a. *Conservatories,* of 9 houses, containing a collection of tender and tropical plants.

b. *Instructional Greenhouses,* 3 in number, for adult and children's classes.

c. *Propagating Houses,* 2 in number.

d. *Experimental Greenhouses,* 4 in number; two each are assigned to the departments of plant pathology and of genetics.

The Conservatories are open free to the public daily, November 1 to March 31, from 10 a.m. to 4 p.m. April 1 to October 31, from 10 a.m. to 4:30 p.m.

Additional propagating and experimental houses are greatly needed. Planting plans for certain portions of the grounds, cannot be realized until more propagating houses are provided.

HERBARIA

The Herbarium collections are, for convenience, administered in the following groups:

I. Vascular plants:

a. General herbarium, of about 57,000 specimens.

b. Long Island herbarium of about 17,000 specimens.

c. Cultivated plants (collected from the Botanic Garden plantations), about 10,000 specimens.

II. Mycological Herbarium, about 72,148 specimens.
III. Bryophytes, about 11,000 specimens.
IV. Algae, about 3,000 specimens.

In the development of scientific work at the Garden, emphasis has been placed on the experimental aspects of botany, and there has been no effort to make the Brooklyn Botanic Garden primarily a taxonomic center.

The herbaria are being developed rather as a supplement to the living collections and to investigations in progress, and with a view to including plants from all parts of the world of some special interest, whether horticultural, economic, or scientific. From the last point of view it is sought to have representatives of all the families of the higher plants, and particularly of those genera in the various families which appear to suggest the primitive condition of the family.

LIBRARY

The Botanic Garden library comprises at present over 11,000 volumes and more than 8,900 pamphlets. During 1927, there were received current numbers of 870 periodical and serial publications and government documents, devoted exclusively, or in part, to botany and various aspects of plant life and gardening. These include practically all of the more important botanical journals published. The total number currently received is 961, but not all of them issued numbers in 1927. The card catalogue contains more than 35,500 Torrey Botanical Club index cards and over 24,000 *Index Algarum Universalis* cards. Among special collections may be mentioned the following:

1. *The library of Annie Morrill Smith* (Mrs. Hugh M. Smith), from 1902 to 1905 co-editor, and from 1906 to 1911 editor of the *Bryologist*. This collection comprises chiefly works on mosses, hepatics, and lichens, and includes many rare and important items.

2. *A growing collection of pre-Linnaean works* (145 volumes as of January 1, 1928), including a number of botanical incunabula. These foundational works, including numerous rare items, and most of the important herbals, are being acquired with the income from the Benjamin Stuart Gager Memorial Fund, pre-

sented to the Garden in 1918 by two anonymous donors. The principal of this fund was originally $10,000, and has since been increased, by reinvestment, to $13,417.27. The annual income is used to purchase rare or expensive works that the library might not otherwise be able to afford.

3. *The pamphlet collection* has been built up by purchase and exchange and by correspondence with investigators and institutions throughout the botanical world, and is rich in authors' separata and publications issued originally as pamphlets. Each pamphlet is bound and readily accessible on the open shelves.

In addition to a portion of the Botanic Garden Collections Fund (contributions to which are solicited annually), and a portion of the income from other sources, the entire income from the following permanent funds is devoted to library purposes in the amounts indicated:

1. George C. Brackett Library Fund ($500) ..	$ 27.48
2. Benjamin Stuart Gager Memorial Fund ($13,417.20)	737.92
3. Martha Woodward Stutzer Memorial Fund ($10,000)	275.00
Total	$1,040.40

The income from other sources brings the library budget for 1928, for the purchase of publications and for binding, to a total of about $7,200.

The library is administered strictly as a reference library, and is open free to the public daily (except Sundays and holidays) from 9 a.m. until 5 p.m., Saturdays from 9 a.m. until noon. By special arrangement investigators may have access to the library outside of official days and hours.

The present library funds are quite inadequate for the purchase of publications and to meet the annual requirements for binding.

SCHOOL SERVICE

I. Activities which center at the Garden.

Teachers are encouraged to bring classes in Nature Study and Geography, as well as Botany, for the following purposes:

a. Field lessons, in the Plantations.

b. Demonstrations in the Conservatories.

c. Practical instruction in plant propagation and related subjects in the instructional greenhouses.

d. Classroom instruction to small groups.

e. Lectures, illustrated by lantern slides and motion pictures, on various aspects of plant life, including agricultural and commercial subjects.

f. Consultation with teachers on problems of teaching botany and nature study.

II. Activities which center at the schools.

a. Supply of study material, including living plants and plant parts, microscopic organisms (both plant and animal).

b. Supply of Petri dishes filled with sterilized Agar, ready for exposure in the study of bacteria and other germs.

c. Penny packets of seeds supplied for planting in school and home gardens.

d. Living plants supplied for the beautification of classrooms (25,000 supplied in 1927).

e. Loan lectures, including lantern slides and lecture text.

f. Teachers are supplied without charge with copies of Brooklyn Botanic Garden *Leaflets,* and *Syllabi* of lectures to school classes.

g. Talks at school assemblies.

h. Model lessons in nature study by members of the Department of Elementary Instruction.

THE BOTANIC GARDEN AND THE PUBLIC

1. **The Grounds** are open free of charge every day in the year from 8 a.m. until dark.

2. **The Conservatories** are also open daily without charge from 10 a.m. to 4 p.m., from November 1 to March 31; and to 4:30 p.m. from April 1 to October 31.

3. **The Reference Library** is open free daily (except Sundays and holidays) from 9 a.m. until 5 p.m.; Saturdays until noon.

4. **A Bureau of Information** on all aspects of plant life and gardening is freely at the disposal of all. Inquiries are received and answered by mail, telephone, and in person.

5. **The Labelled Collections** of living trees, shrubs, and herbaceous plants serve as an out-of-doors museum. They are so arranged as to illustrate the system of plant classification, and horticultural varieties are planted as near as feasible to the wild species to which they are botanically related. Trees and shrubs are grouped with the herbaceous plants to which they are related.

6. **The Plantations** have been laid out with reference to beauty and landscape effect, as well as with reference to botanical and educational considerations, and they are visited by thousands for aesthetic as well as for scientific or educational reasons. The exclusion of motor cars of all kinds renders the Garden the most quiet bit of outdoors in Greater New York. It affords the most complete escape (out of doors) from the distracting sights and noises of the City streets.

THE BOTANIC GARDEN AND THE CITY

The Brooklyn Botanic Garden, established in 1910, is a Department of The Brooklyn Institute of Arts and Sciences. It is supported in part by municipal appropriations, and in part by private funds, including income from endowment, membership dues, and special contributions. Its articulation with the City is through the Department of Parks.

The City owns the land devoted to Garden purposes, builds, lights, and heats the buildings, and keeps them in repair, and includes in its annual tax budget an appropriation for other items of maintenance. One third of the initial cost of the present buildings (about $300,000) was met from private funds.

Appointments to all positions are made by the director of the Garden, with the approval of the Botanic Garden Governing Committee, and all authorized expenditures for maintenance are made in the name of the private organization, from funds advanced by the Institute, which, in turn, is reimbursed from time

to time by the City, within the limits, and according to the terms, of the annual appropriation.

All plants have been purchased with private funds since the Garden was established. In addition to this, it has been the practice of the Garden to purchase all books for the library, all specimens for the herbarium, all lantern slides, and numerous other items, and to pay certain salaries, with private funds.

The urgent needs of the Garden for private funds for all purposes are greatly in excess of the present income from endowment, membership dues, and special contributions. The director of the Garden will be glad to give full information as to the possible uses of such funds to any who may be interested.*

THE GARDEN AND THE ADVANCEMENT OF SCIENCE

As stated on page 148 of this pamphlet, it is the purpose of the Brooklyn Botanic Garden to advance as well as to diffuse a knowledge and love of plants.

For this purpose it is well equipped with laboratories, experimental garden and greenhouses, library, herbarium, and apparatus, as indicated in detail in the preceding pages.

Research work is at present under way along the following lines:

1. Plant Breeding and Genetics.
2. Plant Pathology.
3. Plant Geography.
4. Ecology.
5. Plant Physiology.
6. Systematic Botany (The Classification of Plants).

The results of research prosecuted at the Garden and elsewhere are published by the Garden in various periodicals of world-wide circulation, listed on cover-page 4 of this pamphlet.

What we do not know about plant life is vastly greater than our knowledge, and there is great need of additional provision for botanical research in both pure and applied science.

* A written Agreement, dated, August 17, 1914, between the City of New York and the Institute, touching the Botanic Garden, published in full in the Brooklyn Botanic Garden RECORD, for April, 1915, amends the agreement of September 9, 1912, which amends the original agreement of September 28, 1909, published in the RECORD for January, 1912.

"I do not hesitate to express my opinion that the work which the Brooklyn Botanic Garden is now doing and projecting in the line of research in plant pathology is of high usefulness from the standpoint of both pure and applied science, and that while such excellent work is already being done in this field by various governmental, university, and experimental station agencies, this work is still far from adequate to meet the existing need. The enormous importance to our national strength of an adequate scientific knowledge of the diseases and pathology in general of plants, especially our cultivated plants, is unquestionable; and I sincerely hope that the Brooklyn Botanic Garden may find substantial financial assistance in its attempt to help meet this need." —HERBERT HOOVER, *Secretary of Commerce.*

"I am especially interested in the enlargement and improvement of botanic gardens for I believe that these institutions offer opportunities for a thorough investigation of many important long-time problems which are difficult, if not impossible, for any other institution to satisfactorily provide."—W. M. JARDINE, *Secretary of Agriculture.*

STATISTICS FOR 1927

For the City

1. Over 1,013,000 visitors registered at the entrance turnstiles.
2. Bureau of information on gardening and plant life maintained free to the public.
3. Free library on plant life and gardening served over 7,000 readers.
4. Maintained and developed one of the most beautiful spots in Greater New York.
5. Members enjoy special privileges. Information on request.

For the Schools

6. Over 25,000 plants placed in classrooms of 130 schools.
7. 3,000 teachers in 121 schools, supplied with living plants, plant parts, and other study material in quantity sufficient for the instruction of over 109,000 pupils.

8. 670 teachers held conferences with members of staff concerning problems of teaching biology and nature-study.

9. 59 talks, addresses, and model lessons were given in schools by members of the Botanic Garden staff.

10. 2,300 Petri dishes with sterilized agar supplied for the study of bacteria.

11. Over 705,000 penny packets of seeds supplied to pupils for planting in school and home gardens.

For Education

12. Gave 34 courses of instruction to adults and children, with a total registration of over 5,200.

13. Gave 458 lectures to adults and children with a total attendance of over 25,000.

For Science

14. Continued botanical research in plant pathology, genetics, plant breeding, forest pathology, ecology, genetics, plant physiology.

15. Published 156 research articles.

16. Published Volume III of Brooklyn Botanic Garden Memoirs.

17. Continued the publication of three journals devoted exclusively to research, and having a world-wide circulation.

SOURCES OF INCOME

1. **Municipal Appropriations:**
   - a. Tax Budget for annual maintenance.
   - b. Special Revenue Bonds, Tax Notes, Corporate Stock, etc., for permanent improvements.
2. **Private Funds:**
   - a. Endowment income.
   - b. Annual contributions, solicited and voluntary.
   - c. Membership dues. For full information see p. 161.
   - d. Tuitions and sales.
   - e. Bequests. For forms of bequest see p. 163.

BUDGET FOR 1927

Tax Budget Appropriation (43.4%)...	$ 89,588.63
Private Funds Budget (56.6%)	116,677.99
Total	$206,266.62
Transferred to Endowment Increment Principal....	13,720.35
Available	$192,546.27

The percentages of the budget derived from public and private funds during the three years, 1925–1927, are as follows:

	1925	1926	1927
Tax Budget.....	58%	57%	43%
Private Funds.....	42	43	57

Since 1925 the Tax Budget Appropriation has increased $2,099 (from $87,489 to $89,588 for 1927), or 0.2 per cent.

During the same period the Private Funds Budget has increased $61,142 (from $55,536 to $116,678, in 1927), or 110 per cent.

DISTRIBUTION OF THE BUDGET FOR 1927

The total *available* budget for 1927 ($192,546) was distributed among the four major activities of the Garden as follows:

For Research	For Education	For the Library	For Administration and Maintenance
$37,700	$74,118	$12,230	$68,498
20%	39%	6%	35%

The percentages for the first three items, especially that for research, are too small, and should be increased by additional endowment restricted to scientific and educational work.

PERMANENT FUNDS

1.	General Endowment Fund[1]	$ 50,500.00
2.	Life Membership Fund	6,500.00
3.	George C. Brackett Library Fund	500.00
4.	Benjamin Stuart Gager Memorial Fund	13,417.27
5.	Martha Woodward Stutzer Memorial Fund	10,000.00
6.	Mary Bates Spalding Fund	2,697.00
7.	Special Account W	243,149.27
8.	A. Augustus Healy Bequest	9,798.31
9.	Robert B. Woodward Bequest	25,000.00
10.	Alfred T. White Memorial Tablet Fund	3,889.85
11.	Brooklyn Institute Centennial Fund (Botanic Garden Share)	30,000.00
12.	John D. Rockefeller, Jr., Fund	250,000.00
13.	Citizens Endowment Fund	253,929.26
14.	Endowment Increment Fund[2] (as of Jan. 1, 1928)	46,693.29
	Total Permanent Funds as of January 1, 1928	**$946,074.25**

[1] This was the original private funds account of the Garden, contributed by two citizens of Brooklyn who have wished to remain anonymous. The securing of this fund was one of the conditions for the *Agreement* between the City of New York and the Trustees of The Brooklyn Institute of Arts and Sciences, concerning the establishment and maintenance of the Garden. The Garden has now (1928) met this condition nearly 20 times over.

[2] By a resolution of the Botanic Garden Governing Committee of the Trustees of The Brooklyn Institute of Arts and Sciences, adopted January 11, 1921, only 80 per cent. of the income of certain specified funds is expended annually; the remaining 20 per cent. is added to the principal amount of an *Endowment Increment Fund* and invested. The interest is also added to the principal at the end of each quarter of the fiscal year. This is to be continued for an indefinite term of years, until the Governing Committee decide to devote the income to annual needs, or otherwise modify the plan.

WHAT THE BOTANIC GARDEN NEEDS

In the preceding pages we have briefly set forth the equipment, activities, and resources of the Brooklyn Botanic Garden. The Garden is only eighteen years old—an infant as the life of institutions is measured. It has only just begun to realize its ideals of scientific and educational work and of public service.

This is not the place for a detailed catalogue of individual needs. They may all be tersely summed up in the words, *Additional income*. The director of the Garden will be glad to give full information to any one who may be interested. See also page 163 of this publication.

The most pressing present need is additional endowment for research of not less than	$ 500,000
For the enrichment and expansion of its educational program	500,000
Total additional endowment needed	$1,000,000

INFORMATION CONCERNING MEMBERSHIP

The Brooklyn Institute of Arts and Sciences is organized in three main departments: 1. The Department of Education. 2. The Museums. 3. The Botanic Garden.

Any of the following seven classes of membership may be taken out through the Botanic Garden:

1. Annual member	$ 10	5. Donor	$ 10,000
2. Sustaining member	25	6. Patron	25,000
3. Life member	500	7. Benefactor	100,000
4. Permanent member	2,500		

Sustaining members are annual members with full privileges in Departments one to three. Membership in classes two to seven carries full privileges in Departments one to three.

In addition to opportunities afforded to members of the Botanic Garden for public service through cooperating in its development, and helping to further its aims to advance and diffuse a knowledge and love of plants, to help preserve our native wild flowers, and to afford additional and much needed educational advantages in Brooklyn and Greater New York, members may also enjoy the privileges indicated on the following page.

Further information concerning membership may be had by addressing The Director, Brooklyn Botanic Garden, Brooklyn, N. Y., or by personal conference by appointment. Telephone, 6173 Prospect.

.....

Date .....

To The Secretary,
Brooklyn Botanic Garden,
1000 Washington Ave., Brooklyn, N. Y.

Dear Sir:

I desire to become

An Annual Member	$ 10	A Donor	$ 10,000
A Sustaining Member ...	25	A Patron	25,000
A Life Member	500	A Benefactor	100,000
A Permanent Member ...	25,000		

Please find enclosed my check payable to Brooklyn Botanic Garden, and present my name to the Board of the Trustees for election.

Yours truly,

Name .....

Address .....

PRIVILEGES OF MEMBERSHIP

1. Free admission to the buildings and grounds at all times.
2. Cards of admission for self and friends to all exhibitions and openings preceding the admission of the general public, and to receptions.
3. Services of docent (by appointment), for self and party, when visiting the Garden.
4. Admission of member and his or her immediate family to all lectures, classes, field trips, and other scientific meetings under Garden auspices, at the Garden or elsewhere.
5. Special lectures and classes for the children of members.
6. Copies of Garden publications, as follows:
   - *a*. Record
   - *b*. Guides
   - *c*. Leaflets
   - *d*. Contributions
   - *e*. Frequent Announcement Cards concerning plants in flower and other exhibits
7. Privileges of the Library and Herbarium.
8. Expert advice on the choice and care of plants, indoors and out, on planting the home grounds, the care of lawns, and the treatment of plants affected by insect and fungous pests.
9. Identification of botanical specimens.
10. Participation in the periodical distribution of duplicate plant material and seeds, in accordance with special announcements sent to members from time to time.

NOTE.—Blank forms of application for membership may be had on request.

FORMS OF BEQUEST TO THE BROOKLYN BOTANIC GARDEN

Form of Bequest for General Purposes

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which said sum is to be used for the educational and scientific work of the Brooklyn Botanic Garden.

Form of Bequest for a Curatorship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, as an endowment for a curatorship in the Brooklyn Botanic Garden, the income from which sum is to be used each year towards the payment of the salary of a curator in said Botanic Garden, to be known as the (here may be inserted the name of the donor or other person) curatorship.

Form of Bequest for a Fellowship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which sum is to be used in the payment of a fellowship for advanced botanical investigation in the Brooklyn Botanic Garden, to be known as the .....fellowship.

Form of Bequest for other particular purposes designated by the testator

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, to be used (or the income from which to be used) for the Brooklyn Botanic Garden*

.....

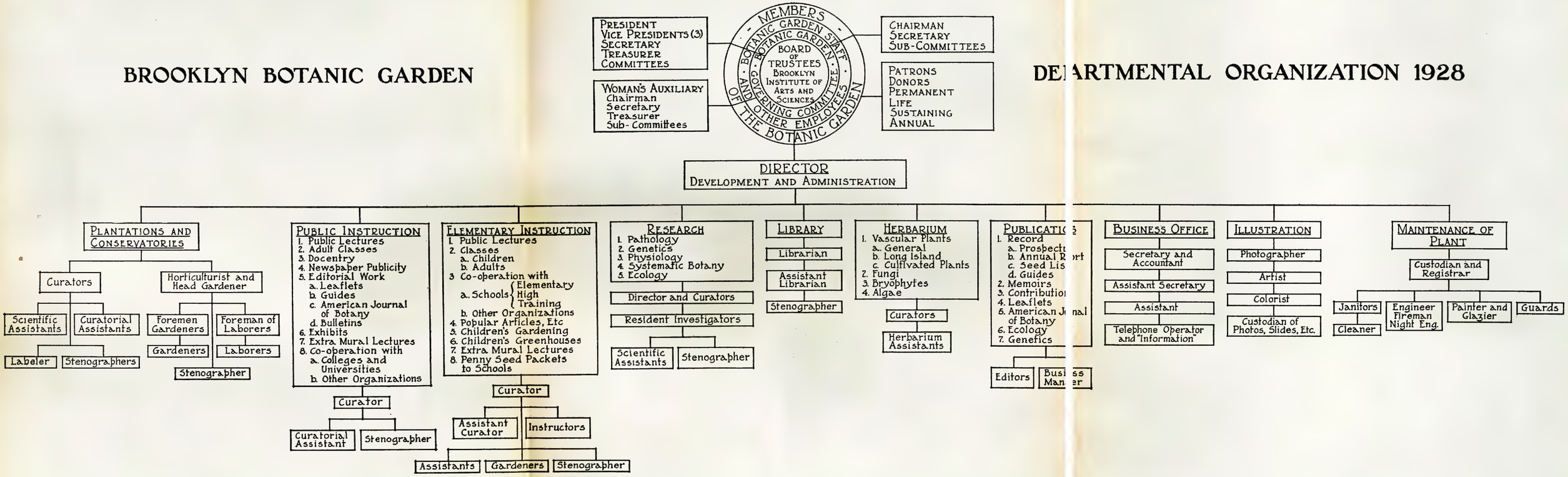
.....

* The following additional purposes are suggested for which endowment is needed.

1. Botanical Research.
2. Publishing the results of botanical investigations.
3. Popular botanical publication.
4. The endowment of a lectureship, or a lecture course.
5. Botanical illustration for publications and lectures.
6. The purchase and collecting of plants.
7. The beautifying of the grounds.
8. The purchase of publications for the library.
9. Extending and enriching our work of public education.

BROOKLYN BOTANIC GARDEN

DEPARTMENTAL ORGANIZATION 1928



The Brooklyn Institute of Arts and Sciences

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THE PRESIDENT OF THE BOROUGH OF BROOKLYN
THE COMMISSIONER OF PARKS, BOROUGH OF BROOKLYN

GENERAL INFORMATION

Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, Brooklyn, N. Y.* Telephone, 6173 Prospect.

The Botanic Garden is open free to the public daily from 8 a.m. until dark; on Sundays and Holidays open at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard (Malbone Street), and near Mt. Prospect Reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Montgomery Street.

To Assist Members and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one week in advance. No parties of less than six adults will be conducted.

To Reach the Garden take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, and Tompkins Avenue trolleys to Washington Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street and Vanderbilt Avenue trolleys to Prospect Park Plaza and Union Street.

PUBLICATIONS

OF THE

BROOKLYN BOTANIC GARDEN

RECORD. Established, January, 1912. An administrative periodical issued quarterly. Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, announcements of courses of instruction, seed list, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others one dollar a year; 25 cents a copy. Circulates in 41 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Circulates in 47 countries.

Volume I. *Dedication Papers:* comprising 33 scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. 521 pages. Price $3.50, plus postage.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk: A study of grassland and forest. By Norman Taylor, June 11, 1923. 108 pages. Price $1.00, plus postage.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor, June 10, 1927. 151 pages. Price $1.60.

CONTRIBUTIONS. Established, April 1, 1911. Papers originally published in periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume. Circulates in 34 countries.

50. The climate of Long Island; its relation to forests, crops, and man. 20 pages, 2 plates. 1927.

51. Experimental studies on head smut of corn and sorghum. 16 pages, 5 plates. 1927.

52. Inheritance studies in Pisum. VI. Multiple allelomorphism and the inheritance of green and yellow foliage and pod color. 16 pages. 1927.

55. Physiologic races of bunt of wheat. 14 pages. 1928.

56. The inheritance of resistance of oat hybrids to loose and covered smut. 48 pages. 1928.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication.

SEED LIST. (*Delectus Seminum*) Established, December, 1914. Since 1925 issued each year in the January number of the RECORD. Circulation includes 143 botanic gardens and institutions located in 42 countries.

AMERICAN JOURNAL OF BOTANY. Established, January, 1914. Published, in coöperation with the BOTANICAL SOCIETY OF AMERICA, monthly, except during August and September. Subscription, $7.00 a year. Circulates in 48 countries.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $4.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bi-monthly. Subscription, $6.00 a year. Circulates in 37 countries.

BROOKLYN BOTANIC GARDEN RECORD

VOL. XVII OCTOBER, 1928 NO. 4

PROSPECTUS

OF COURSES, LECTURES, AND OTHER EDUCATIONAL ADVANTAGES OFFERED TO MEMBERS AND TO THE GENERAL PUBLIC

1928-9

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BROOKLYN BOTANIC GARDEN

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* Resigned, August 31, 1928.

INFORMATION ABOUT THE BROOKLYN BOTANIC GARDEN

THE BROOKLYN BOTANIC GARDEN, established in 1910, is a Department of the Brooklyn Institute of Arts and Sciences. It is supported in part by municipal appropriations, and in part by private funds, including income from endowment, membership dues, and special contributions. Its articulation with the City is through the Department of Parks.

By an agreement with the City of New York, the functions of the Garden have been defined as two-fold, and may be summarized as follows: first, the advancement of botanical science through original research; and, second, the dissemination of a knowledge of plants.

The first of these activities is carried on by curators, resident investigators, fellows, and others, who devote all or a part of their time to independent investigation.

The second, the dissemination of botanical knowledge, is accomplished in the following ways:

I. By the teaching of classes—
   a. of children who come voluntarily outside of school hours;
   b. of children who come with their teachers from public and private schools for special lessons on plant life and closely related subjects;
   c. of adults who are interested in some phase of pure or applied botany.

II. By lectures at schools and elsewhere by the various staff members.

III. By loan sets of lantern slides accompanied by lecture text, for use in the schools.

IV. By the distribution to schools of study material for classes in botany, biology, and nature study.

V. By public lectures and educational motion pictures at the Botanic Garden.

VI. By maintaining labelled collections of living plants, arranged systematically and otherwise on the grounds and in the Conservatories of the Garden.

VII. By the herbarium, containing specimens of preserved plants from all parts of the world.

VIII. By maintaining a reference library on plant life and related subjects, open free to the public daily (except Sundays and holidays).

IX. By the following periodicals, published by the Botanic Garden:

1. American Journal of Botany.
2. Ecology.
3. Genetics.
4. Brooklyn Botanic Garden Record.
5. Leaflets.
6. Contributions.
7. Memoirs.

X. By the maintenance of a Bureau of Public Information on all phases of plant life.

XI. By providing docents to accompany members and others who wish to view the collections under guidance.

XII. By cooperating with City Departments and other agencies in the dissemination of botanical knowledge.

The Brooklyn Botanic Garden is also taking an active part in the State-wide movement for legislation for the conservation of our native American plants.

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PROSPECTUS: 1928–29[1]

I. COOPERATION WITH LOCAL SCHOOLS

The Brooklyn Botanic Garden aims to cooperate in every practicable way with the public and private schools of Greater New York in all matters pertaining to the study of plants and closely related subjects. The purpose of the Garden in this connection is to supplement and enrich the school work in the way of instruction, demonstration, methods, study material, etc., which otherwise would not be available.

Geography classes, as well as classes in nature study and botany, are finding the collection of useful plants in the economic plant house, and also our Japanese Garden, valuable adjuncts to their class work. Arrangements may be made by teachers of geography to have their classes study these collections under guidance. Illustrated lectures for geography classes may also be arranged for at the Garden.

The systematic collection in the main part of the Garden, where the living plants are arranged by orders and families, is proving of great value for demonstration to visiting high school classes in botany.

A. Talks at Schools.—The principals of public or private schools may arrange to have lantern talks given at the schools on various topics related to nature study, such as garden work with children, tree planting, and Arbor Day. If an illustrated lecture is desired, the lantern and operator must be provided by the school, but slides will be furnished by the Botanic Garden. Address the *Curator of Elementary Instruction* for a list of talks and for appointments.

B. School Classes at the Garden.—(*a*) Schools not provided

[1] Brooklyn Botanic Garden Record, Vol. XVII, No. 4, October, 1928.

with a stereopticon, and other schools, may arrange for classes, accompanied by their teachers, to come to the Botanic Garden for lectures either by the teacher or by a member of the Garden Staff.

(*b*) Notice of such a visit should be sent at least *one week* previous to the date on which a talk is desired. Blank forms are provided by the Garden for this purpose. These talks will be illustrated by lantern slides, and by the conservatory collection of useful plants from the tropics and subtropics. Spring and fall announcements of topics will be issued during 1928–9.

(*c*) The Garden equipment, including greenhouses, plant material, lecture rooms, lantern and slides, is at the disposal of teachers who desire to instruct their own classes at the Garden. Arrangements must be made in advance so that such work will not conflict with other classes and lectures. For High School classes address the *Curator of Public Instruction.* For Junior High and Elementary School classes address the *Curator of Elementary Instruction.*

(*d*) The principal of any elementary or high school in Brooklyn may arrange also for a series of six lessons on plant culture to be given during the fall or spring to a class. These lessons will be worked out for the most part in the greenhouse. Such a course must be arranged for in advance, and the class must be accompanied by its teacher. This is adapted for pupils above the third grade.

C. Seeds for School and Home Planting.—Penny packets of seeds are put up by the Botanic Garden for children's use. In the early spring, lists of these seeds and other information may be secured on application to the *Curator of Elementary Instruction.*

D. Conferences.—Conferences may be arranged by teachers and principals for the discussion of problems in connection with gardening and nature study. Appointments must be made in advance. Address Miss Ellen Eddy Shaw.

E. Study and Loan Material.—To the extent of its facilities, the Garden will provide, on request, various algae and protozoa, as well as living plants, leaves and twigs, or other plant parts for study. Where containers are necessary, as in the case of the algae and protozoa, they must be furnished by the school. Petri-dishes will, on request, be filled with sterilized nutrient agar ready for use in the study of bacteria and molds. They should be deliv-

ered to the Garden, *clean,* and in general one week before the agar is desired. In all cases arrangements must be made by the teachers for calling for such material.

Material usually available

1. Protozoa: Paramoecium, Vorticella, and others.
2. Pleurococcus.
3. Spirogyra.
4. Vaucheria.
5. Blue-green algae.
6. Moss plants: gametophyte and sporophyte, with capsules.
7. Fern prothallia. For these, a Petri dish with a cover is the best container to bring, since the prothallia dry out quickly.
8. Fern sporophylls (with sori).
9. Coleus and Tradescantia—variegated green and white, loaned for photosynthesis experiment.
10. Cacti, Pitcher plant, Sundew (*Drosera*), and Venus's Flytrap (*Dionaea*)—loaned for demonstration.
11. Elodea—to show movement of protoplasm.
12. Various collections loaned for exhibit: *e.g.,* lichens, fungi, plant diseases, fruits, modified leaves, demonstrations of Mendel's law.

F. Demonstration Experiments.—Teachers may arrange to have various physiological experiments or demonstrations conducted at the Garden for the benefit of their classes. Communications in regard to these matters should be addressed to the *Curator of Public Instruction.*

G. Loan Sets of Lantern Slides.—Sets of lantern slides have been prepared for loan to the schools. Each set is accompanied by a short syllabus of explanatory nature. In all cases these sets must be called for by a special messenger and returned promptly in good condition. The subjects now available are as follows. Other sets are in preparation.

1. Plant Life
2. Spring Wild Flowers
3. Common Trees
4. Fall Wild Flowers
5. Forestry (2 sets)

II. DOCENTRY

To assist members and others in studying the collections the services of a docent may be obtained. Arrangements must be made by application to the Curator of Public Instruction at least one week in advance. No parties of less than six adults will be conducted. This service is free of charge to members; to others there is a charge of 50 cents per person. For information concerning membership in the Botanic Garden see page 3 of the cover of this PROSPECTUS.

III. COURSES OF INSTRUCTION

A. Children's Garden: Nature Study

For the work in Children's Gardening and Nature Study the following equipment is available:

1. *The Children's Garden,* on a piece of land about three-quarters of an acre in extent, in the southeast part of the Botanic Garden, divided into about 150 plots which are used throughout the season for practical individual instruction in gardening.

2. *The Children's Building,* near the north end of this plot, containing rooms for consultation and for the storage of tools, seeds, notebooks, special collections, etc.

3. *The Instructional Greenhouses,* three in number, for the use of juvenile as well as adult classes for instruction in plant propagation and related subjects.

4. Three *Classrooms* (in addition to the Boys' and Girls' Club Room in the Laboratory Building), equipped with stereoscopes and views, a stereopticon, plant collections, economic exhibits, models, and other apparatus and materials for instruction.

5. Two *Laboratory Rooms,* with the usual equipment for plant study.

6. The *Auditorium,* on the ground floor, capable of seating 570 persons, and equipped with a motion-picture lantern and stereopticon.

In addition to these accommodations, the dried plant specimens in the herbarium and the living plants in the conservatories and plantations are readily accessible, while the main library and chil-

dren's library, which contain a comprehensive collection of books on every phase of gardening and plant life, may be consulted freely at any time.

1. *Courses for Children*

The following courses are open to all boys and girls. Enrollment in these courses entitles the boy or girl to membership in the Boys' and Girls' Club of the Brooklyn Botanic Garden. This club, having an active membership of about 1,000, meets twelve times a year for discussion of subjects related to plant life. Papers, by members, on various botanical and horticultural subjects, are read at these meetings, and the speakers are then entitled to a silver pin, providing they have satisfactorily completed courses of study at the Garden extending over at least six months. For announcement concerning Children's Room see page 180.

A1. Fall Greenhouse Work.—The following courses are self-explanatory and are for both beginners and advanced students:

Class A.—Open to boys and girls who have never taken any greenhouse work before. Bulbs used: narcissus, oxalis, primrose; also geranium cuttings. *Saturday* mornings at 9:15. *Fee, fifteen cents. October 27 to December 22.*

Mrs. Bartlett and Miss Marcy.

Class B.—Open to boys and girls over thirteen years of age. Subjects studied: hyacinth, Easter lily, calla lily, the botany of common cultivated plants, etc. *Fee, fifteen cents. Saturday* mornings at 9:15, *October 27 to December 22.* Miss Sargent.

Class C.—Open to boys and girls who have been in at least two fall bulb classes before this. This class is for advanced work. The bulbs used will be hyacinth, tulip, narcissus, oxalis. Geranium cuttings and primroses will also be used. Time of class, 10:30, *Saturday* mornings. *Fee, fifteen cents. October 27 to December 22.* Mrs. Bartlett.

Class D.—Open to any boy or girl. Subject: the making of garden Christmas presents. There will be a choice of gifts. Some of the articles made will be the following: a flower basket, seed packet, flower book-mark, painted pot and plant to go in it, flower calendar, wooden box with flower design, etc. *Saturday* mornings at 10:30. *Fee, fifteen cents and cost of materials. October 27 to December 22.* Miss Sargent and Miss Marcy.

Class E.—Silver Pin work as applied to greenhouse and garden

work. The members of this class will be selected from students eligible for this work. *Fee, twenty-five cents.* Mrs. Bartlett.

A2. Junior Gardeners' Course.—This is a course for boys 14–17 years of age. Lessons are given in the care of border and other flower beds, in the weeding and care of small vegetable gardens, in mowing and watering lawns, repotting plants, etc. This is planned to fit boys for summer work and to enable them to obtain positions. Hours to be arranged. *Fee, fifty cents.*

Miss Sargent.

A3. Preparation for the Outdoor Garden.—The following classes are open to boys and girls during the spring of each year. The courses are planned for a better understanding of plant life and so that the outdoor garden may become a more intelligent piece of work. On account of limited space in the Children's Greenhouse, classes are limited to twenty. The fee for each course is *fifteen cents* to cover the cost of material.

Boys' Spring Course.—(a) *Saturday* mornings, 9–10:15, *February 9 to April 20.* (b) *Saturday* mornings, 10:30–11:30, *February 9 to April 20.* Mrs. Bartlett and Miss Marcy.

Girls' Spring Course.—(a) *Saturday* mornings, 9–10:15, *February 9 to April 20.* (b) *Saturday* mornings, 10:30–11:30, *February 9 to April 20.* Miss Sargent.

A4. Advanced Work for Older Boys and Girls.—How to raise plants, mix soils, transplant, start seedlings for outdoor gardens, etc. Boys and girls who have taken spring courses under A5 are eligible for advanced work. The fee for the course is *twenty-five cents.* Each student may take home his plants and seedlings. This course is open to both boys and girls over twelve years of age. *Saturday* mornings at 9:30, *January 12 to February 9.*

A5. The Beginners' Garden.—Open annually to 50 boys and girls who have never had instruction in gardening at the Brooklyn Botanic Garden. This course takes up the subject of the small garden, what to plant, how to plant it, care, replanting, etc. *Application for plots should be made in person or in writing before March 1.* Size of plots 8 ft. by 10 ft. All crops belong to the individual. *Fee, twenty-five cents. Saturday* mornings, 9–12, *May 4 to October 19.* Miss Sargent and Assistants.

A6. Second Year Gardens.—Open to 50 boys and girls who have had one or more seasons at the Brooklyn Botanic Garden—a continuation of Course A5. Registration should be made before September 1 of each year for the following year. *Fee, twenty-five cents. Saturday* mornings, 9–12, *May 4 to October 19.*

Miss Sargent.

A7. Junior Garden Assistants.—Open to older boys and girls, or to those who have mastered Courses A2 and A4. Size of plot 10 ft. by 20 ft. These gardens are for the raising of vegetables. The work is in the nature of a project, "How much can one raise on a plot 10 ft. by 20 ft.?" Hours to be arranged. The student must put in at least two periods a week during the summer vacation, and, if possible, three. Registration date: *April 6. Fee, fifty cents.*

Miss Sargent.

A8. Advanced Nature Work.—A course designed for those older boys and girls who have taken Courses A1–A5. Herbarium specimens will be prepared and the simpler principles of plant classification studied. Projects will be assigned to individuals. *Open only to pupil assistants of the Garden.* Hours to be arranged. *No fee.*

Miss Shaw.

A9. Nature Study for Boy Scouts, Girl Scouts, Camp Fire Girls, Scout Leaders, and Others.—Short courses of at least four periods each, with talks, demonstrations, and field trips in the grounds of the Botanic Garden and Prospect Park to study trees, shrubs, etc. The instruction and schedule dates will be adapted to meet the needs of the various groups that apply. *Open only to groups of at least ten persons.* Hours to be arranged. *No fee.*

Dr. Graves, Miss Sargent, and assistants.

A10. Special Work for High School Pupils.—A course in gardening or greenhouse work adapted for high school pupils. Classes to be arranged for by the high school teacher. *No fee.*

Miss Shaw and assistants.

2. Courses for Teachers

The following brief courses are designed primarily for teachers who wish to extend their knowledge of nature study and gardening for use in their school work, without taking the longer courses described under B, page 172. It should be noted that only the lat-

ter courses are accepted by the Board of Education for teachers' credits.

A21. Greenhouse Work for Teachers.—Not given in 1928.

A22. The School Garden.—See B5, p. 173.

A23. Spring Nature Study for the Classroom.—Not given in 1928.

A24. Fall Garden Work.—Three lessons on home plants; window boxes; indoor planting of bulbs; the outdoor bulb bed. *No fee. Mondays,* 4 p.m., *October 1–15.*

Miss Shaw and assistants.

A25. Fall Nature Study.—Three lessons. This course is a complement to the spring nature study work, and the material used will be the common material one would use in classroom work, showing seed dispersal, evergreens, deciduous trees, etc. Such subjects as Nature's preparation for winter will be considered. *No fee. Mondays,* 4 p.m., *October 22–November 5.* Miss Shaw.

A26. Greenhouse Work.—Fifteen lessons. A course for those interested in the propagation and care of house plants. Lessons such as repotting ferns, forcing blooming plants, shaping plants, plant insects and diseases, making window boxes, Wardian cases and desert gardens, will be carried on in the greenhouses. Emphasis will be put on problems of a practical nature. *Limited to 15 members. Fee, $5. Tuesdays,* 4 p.m., beginning *October 9.*

Mrs. Kathryn Clark Bartlett.

B. Courses for Teachers Given in Cooperation with the Brooklyn Teachers' Association

These courses have been accepted by the Brooklyn Teachers' Association and appear in its Syllabus of Courses. One credit for each 15 hours is accepted for higher teaching licenses.

All B courses are *free to members of the Botanic Garden;* from other persons the indicated fee is required. No course will be given when less than six apply.

The individual student may apply at any college for credits on these courses, which will be granted according to individual merit.

B1. General Botany.—Thirty sessions. A course on the forms and functions of plants. All of the main groups of plants are considered, by means of informal lectures, discussions, demon-

strations, and visits to the conservatories and the outdoor plantations. With a view to correlation with the other courses described below, particular emphasis is laid upon the higher plants. Optional laboratory work with the compound microscope, *Saturdays,* 10–12. *Fee, $5. Thursdays,* 4 p.m., beginning *October 4.*
Dr. Graves and Miss Rusk.

B2. Nature Study.—Fifteen sessions. This course is based on the New York City outline of nature study for grades three to six inclusive. Mounts, charts, and diagrams are made. The student becomes familiar with actual material. The course is entirely practical, work being done in both field and laboratory. Two hours of class work are credited as one hour. *Fee, $5. Tuesdays,* 4 p.m., beginning *September 25.* Miss Shaw.

B3. Principles of Agriculture and Horticulture.—Thirty sessions. This course will be especially helpful to teachers. The principles of horticulture are considered and applied in a practical way through greenhouse, laboratory, and lecture work. The greenhouse work includes the following subjects: plant propagation by means of bulbs, rhizomes, roots, seeds, etc.; the care of the greenhouse; house plants; window-box materials; fertilizers. Insect and fungous pests, grafting, and pruning are also included from both a practical and a theoretical point of view. *Fee, $7. Wednesdays,* 4 p.m., beginning *September 26.*
Miss Shaw and Mr. Free.

B3[2]. Principles of Agriculture and Horticulture.—Thirty sessions. A continuation of B3. Work is done almost entirely in the greenhouses. *Fee, $8. Thursdays,* 4 p.m., beginning *September 27.* Miss Shaw and Miss Sargent.

B4. Pedagogy of Botany and Educational Principles of Children's Gardening and Nature Study.—Not given in 1928–29.

B5. Garden Practice.—Fifteen sessions. This course is entirely practical and includes all the outdoor work of the student in his own garden, applying the principles of agriculture and gardening, work with children in the garden, basketry and woodwork. *Fee, $5: for summer practice, fee $8 additional. Tuesdays,* 4 p.m., *February 19 to May 28.* Miss Shaw and Miss Sargent.

C. Courses for the General Public

The following courses are open to any one who has a general interest in plants. Teachers are welcome. They are *free to members of the Botanic Garden;** for others a small fee is required, as specified. Registration should be made with the instructor in person or by mail at least one week before the course opens, in order that adequate material, etc., may be provided. *No course will be given when less than six apply.*

1. *Full Year Course*

C10. The Life of Plants.—Thirty exercises, extending through the school year, consisting of informal lectures, demonstrations, and short trips to the conservatories and outdoor plantations. No previous knowledge of botany is necessary. The main purpose of the course is to enable any who are interested to become acquainted with the different main groups of plants—their life histories, habits, economic uses, etc. Bacteria, algae, fungi, lichens, mosses, ferns, cycads, and flowering plants are considered. The various functions manifested by plant life in general, such as growth, reproduction, sensitiveness, movement, respiration, and metabolism are also discussed. Optional work with the compound microscope, *Saturdays,* 10–12. *Fee, $5. Wednesdays,* 4 p.m., beginning *October 3.* Dr. Graves and Miss Rusk.

2. *Fall Courses*

C4. Gardening in the Fall.—Six lessons, with practical work in the greenhouse, on the methods of making cuttings, the various kinds of bulbs for fall planting, their treatment and care, the proper management of house plants, and a discussion of the kinds suitable for cultivation. *On account of restricted space in the greenhouse, this class must be limited to 40. Registration according to the order of application. Fee, $3. Thursdays,* 4 p.m., *October 4 to November 8.* Mr. Free.

C5. Trees and Shrubs in their Winter Condition.—Eight outdoor lessons in the Botanic Garden and elsewhere in Greater New

* For information concerning membership in the Brooklyn Botanic Garden consult the third page of the cover of this PROSPECTUS.

principal object being to gain a ready acquaintance with the common trees and shrubs of the eastern United States, which are well represented in this region. The species are considered in systematic order, and the features pointed out by which they may be most easily recognized; also their habits, rate of growth, economic value and use, methods of planting and propagation; importance in forestry, horticulture, and landscape art. *Fee, $5. Saturdays,* 2:30 p.m., *April 6 to June 8.* Dr. Graves.

C11. Spring Flowers and Ferns of the New York Region.—This is a field course of eight exercises given in the parks and woodlands of Greater New York. The common native and naturalized wild flowers are visited as they come into flower, and their characteristics and distinguishing features studied. *Class limited to 30, taken in the order of application. Fee, $4. Saturday afternoons; April 27 to June 15.* Dr. Gundersen.

C12. The History of Systematic Botany.—Three illustrated lectures. 1. Natural science of the ancients and the Middle Ages. 2. The study of plants from the discovery of America to Linnaeus and the Jussieus. 3. The idea of plant evolution in the nineteenth century and after. *Fee, $1. Fridays,* 4 p.m., *March 8–22.* Dr. Gundersen.

D. Course for Student Nurses

D1. General Botany with Special Reference to Medicinal Plants.—A course of conferences, demonstrations, and field trips for student nurses. The general principles governing the life of plants, as well as the use and care of flowers in the sick room will be considered. Special attention will be paid to the identification of officinal plants in the field. Hours to be arranged. *No fee.* Dr. Graves.

E. Consultation and Independent Investigation

1. *Consultation*

Consultation and advice, and the facilities of the laboratories, library, and herbarium are freely at the service of members of the Botanic Garden and others with special problems relating to plants or plant products, especially in the following subjects:

1. **Plant diseases** (phytopathology) and classification of fungi (mycology). Dr. Reed.

2. **Plant breeding** and allied subjects (genetics and experimental evolution). (*Not offered in 1928–9.*)

3. **Plant geography** (phytogeography) **and ecology.** Mr. Taylor.

4. **Classification and identification of flowering plants** (systematic botany). Special groups studied in the Garden, supplemented by herbarium studies. Dr. Gundersen.

5. **The growing of cultivated plants** and their arrangement; also their adaptation to soils, climate, and other factors (horticulture and gardening). Mr. Free.

2. *Investigation* *

For the following research courses, open to those properly qualified for independent investigation, there is a charge covering all expenses, including laboratory fee, of *$30 for each full course* of 100 credit hours, and *$20 for each half course* of 50 credit hours.

E6. Research in Mycology and Plant Pathology.—Independent investigation of problems relating to fungi and fungous diseases of plants. Dr. Reed.

E7. Research in Plant Genetics.—Independent investigation of problems of variation and heredity, including that phase of cytology having a direct bearing on the subject matter of genetics. (*Not offered in 1928–9.*)

E8. Research in Forest Pathology.—Independent investigation of the diseases of woody plants. Dr. Graves.

E9. Research in Systematic Botany of the Flowering Plants. Dr. Gundersen.

* Courses of graduate rank offered by the Botanic Garden, when approved by the Faculty of the Graduate School of New York University, are listed as courses in the Graduate School, and are given the same credit as other graduate courses. Properly qualified students who take these courses may present them in satisfaction of the requirements for advanced degrees given by the University. Graduate credit has also been allowed elsewhere for such advanced work done at the Garden.

IV. OTHER EDUCATIONAL FEATURES

Plantations

The plantations comprise several sections, as follows:

1. General Systematic Section (trees, shrubs, and herbaceous plants arranged according to orders and families).
2. The Local Flora (native wild flower garden).
3. Ecologic Garden.
4. Rock Garden.
5. Japanese Garden.
6. Rose Garden.
7. Iris Garden.
8. Water Garden.
9. Children's Garden.
10. Shakespeare Garden.
11. Horticultural Garden.
12. Experimental Garden.
13. Nursery.

As noted under *Docentry,* arrangements may be made for viewing the plantations under guidance. They are open free to the public daily from 8 a.m. until dark; on Sundays and holidays from 10 a.m until dark.

Conservatories

The Garden conservatories contain a collection of tender and tropical plants. Of special interest for teachers of nature study and geography are the following useful plants from the tropics and subtropics: banana, orange, lemon, lime, kumquat, tamarind, West Indian cedar (the source of the wood used for cigar boxes), eucalyptus, Manila hemp, sisal, pandanus (source of the fiber used for making certain kinds of fiber hats), fig, grape vines from north and south Africa, date palm, coconut palm, chocolate tree, coffee, tea, ginger, bamboo, mahogany, balsa, cocaine plant, black pepper, cardamom, olive, pomegranate, logwood, durian, mango, sugar cane, avocado (so-called "alligator pear"), West Indian and other rubber plants, banyan, religious fig of India, and numerous others.

The Conservatories are open April 1 to October 31, 10 a.m.–4:30 p.m. (Sundays, 2–4:30); November 1 to March 31, 10 a.m.–4 p.m. (Sundays 2–4).

Herbarium

The Garden herbarium consists at present of about 186,500 specimens, including phanerogams, ferns, mosses, liverworts, lichens, parasitic and other fungi, algae, and myxomycetes. This collection may be consulted from 9 a.m. until 5 p.m. by those interested, and specimens submitted will be gladly identified.

Library

The rapidly growing library of the Garden comprises at present over 11,000 volumes and over 8,900 pamphlets. This is not a circulating library, but is open free for consultation to all persons daily (except Sundays and holidays) from 9 a.m. until 5 p.m. (Saturdays, 9 to 12). Over 950 periodicals and serial publications devoted to botany and closely related subjects are regularly received. These include the transactions of scientific societies from all quarters of the globe, the bulletins, monographs, reports and other publications of various departments of the United States Government, as well as those of foreign governments; of all state agricultural experiment stations and agricultural colleges; the publications of research laboratories, universities, botanic gardens and other scientific institutions of the world, as well as the files of independent journals devoted to the various phases of plant life. The library is especially rich in publications of foreign countries.

Laboratory Building

The Laboratory Building contains (besides offices of administration and the Library and Herbarium mentioned above) four laboratory rooms, a culture room, three classrooms with stereopticon and other equipment for instruction, a room for the installation of temporary exhibits, six private research rooms, and an auditorium seating about 570 and equipped with motion picture machine, stereopticon and lecture table supplied with water, gas, and electric current for lectures involving experimental work.

Instructional Greenhouses

A range of three greenhouses, each about 20x30 feet, is provided for the practical instruction of children and adults in plant propagation and other subjects.

Children's Room

A gift of $1,500 in 1921 from Mrs. Helen Sherman Pratt, supplemented in 1923 by a further gift of $500 from Mr. George D. Pratt, has made it possible to provide a beautifully decorated room for the use of the Boys' and Girls' Club. Any boy or girl who is enrolled, or has been enrolled, in any of the children's classes at the Garden is eligible for membership in this club, which now numbers about 1,000 active members. The room contains shelves for a nature-study library, of which a nucleus has already been secured, and is equipped with stereoscopic views, photographs, and preserved and living specimens of plant life, for the instruction and entertainment of boys and girls. The room is open free to all children. Contributions of specimens and of books on nature study and closely related subjects will be most welcome.

Children's Garden Building

This is located in the northern part of the Children's Garden plot and contains a conference room, and rooms for the storage of garden tools and implements. The furniture in the conference room was a gift from Mrs. James H. Post. Various collections of plants, seeds, and insects of economic importance in the garden are accessible here for consultation by the children. A garden library, a gift of friends, has been added. North of the Children's Building is a plot planted to ornamental shrubs and herbaceous perennials for the instruction of the children.

Children's Garden

A plot of about three quarters of an acre in the southeast part of the Botanic Garden is devoted to the theoretical and practical instruction of children in gardening. The larger part of this area is laid out in garden plots which will accommodate about 150 children.

Rose Garden

The Rose Garden, occupying about one acre in the northwest part of the Botanic Garden, was formally opened to the public on Sunday afternoon, June 24, 1928. This garden was made

possible by a gift of $10,000, later increased to $15,000, from Mr. and Mrs. Walter V. Cranford, of Greenwich, Connecticut.

The general plan of the Garden is as follows. At the north end, entrance is gained through a Doric pergola. Three parallel rows of beds extend to the southward from the pergola, as far as the pavilion. In the central row of beds, varieties of hybrid perpetuals have been planted; in each of the two side rows varieties of hybrid teas. In the location of these varieties the older forms appear at the beginning, near the pergola, the most recent productions near the pavilion, with the intermediate forms in chronological sequence between. Varieties of pillar and post roses are planted at regular intervals, on suitable supports, in the beds, with standards between the beds of the side rows. The trellis surrounding the garden as well as the pergola and pavilion furnishes support for climbing roses, while the marginal beds along the trellis are for wild species and their derivatives. South of the pavilion, three additional beds are devoted to historical roses, *i.e.*, those mentioned in ancient literature, and to roses of commercial use.

The Rose Garden is open to the public from 1 to 5 on weekday afternoons, except holidays. Children are admitted only when accompanied by responsible adults.

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GENERAL INFORMATION

Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, Brooklyn, N. Y.* Telephone, 6173 Prospect.

The Botanic Garden is open free to the public daily from 8 a.m. until dark; on Sundays and Holidays open at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard (Malbone Street), and near Mt. Prospect Reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Montgomery Street.

To Assist Members and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one week in advance. No parties of less than six adults will be conducted.

To Reach the Garden take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, and Tompkins Avenue trolleys to Washington Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street and Vanderbilt Avenue trolleys to Prospect Park Plaza and Union Street.

PUBLICATIONS

OF THE

BROOKLYN BOTANIC GARDEN

RECORD. Established, January, 1912. An administrative periodical issued quarterly. Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, announcements of courses of instruction, seed list, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others one dollar a year; 25 cents a copy. Circulates in 41 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Circulates in 47 countries.

Volume I. *Dedication Papers:* comprising 33 scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. 521 pages. Price $3.50, plus postage.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk: A study of grassland and forest. By Norman Taylor, June 11, 1923. 108 pages. Price $1.00, plus postage.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor, June 10, 1927. 151 pages. Price $1.60.

CONTRIBUTIONS. Established, April 1, 1911. Papers originally published in periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume. Circulates in 34 countries.

50. *The climate of Long Island; its relation to forests, crops, and man.* 20 pages, 2 plates. 1927.

51. *Experimental studies on head smut of corn and sorghum.* 16 pages, 5 plates. 1927.

52. *Inheritance studies in Pisum. VI. Multiple allelomorphism and the inheritance of green and yellow foliage and pod color.* 16 pages. 1927.

55. *Physiologic races of bunt of wheat.* 14 pages. 1928.

56. *The inheritance of resistance of oat hybrids to loose and covered smut.* 48 pages. 1928.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication.

SEED LIST. (*Delectus Seminum*) Established, December, 1914. Since 1925 issued each year in the January number of the RECORD. Circulation includes 143 botanic gardens and institutions located in 42 countries.

AMERICAN JOURNAL OF BOTANY. Established, January, 1914. Published, in coöperation with the BOTANICAL SOCIETY OF AMERICA, monthly, except during August and September. Subscription, $7.00 a year. Circulates in 48 countries.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $4.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bi-monthly. Subscription, $6.00 a year. Circulates in 37 countries.